SEPTEMBER 9, 1996 VOLUME 13, NUMBER 37

NetworkWorld

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

Have YOU entered yet?
More details, page 10.

USER EXCELLENCE 12 AWARDS

Plaintree aims high with gigaswitch

WaveSwitch 9000 chassis boasts 16G bit/sec backplane, can serve as switch of switches.

INTEROP PREVIEW

By Jodi Cohen
Waltham, Mass.

Plaintree Systems, Inc. may be a small LAN switch player, but it thinks big.

The company next week will preview a switch at NetWorld+Interop 96 in Atlanta that boasts a combination of backplane capacity and port density unmatched today by even the industry's biggest and best known players.

The WaveSwitch 9000 chassis can be used in a variety of ways, including as a switch of switches. It features a switching capacity of about 16G bit/sec, which provides enough raw bandwidth to support as many as 16 separate Switched Gigabit Ethernet, 128 Fast Ethernet or 384 Ethernet ports. That is six more Gigabit Ethernet ports than Cabletron Systems, Inc.'s Multi Media Access Center-Plus can contain, double the number of Fast Ethernet ports supported by Cisco Systems, Inc.'s Catalyst 5000 and four times as many switched Ethernet ports as Xylan Corp.'s OmniSwitch can handle.

The WaveSwitch 9000 also bests competitor 3Com Corp.'s LANplex 6000, industry observers said. Although the LANplex 6000 has a 19.5G bit/sec backplane, it can only support up to 88 switched Fast Ethernet and 176 switched Ethernet ports.

Vendors will have to pump up port densities and backplane capacities to compete on raw performance, analysts said.

"This Plaintree switch is optimized for high-performance campus networking," said John McConnell, president of McConnell Consulting, Inc., based in Boulder, Colo. "Other vendors will surely have to follow because they need to start pro-

See Plaintree, *page 80*

MIX AND MATCH

Customers can configure Plaintree's WaveSwitch 9000 chassis to be used in variety of ways.

Typical configurations

- Workgroup/department switch: 192 Ethernet, 40 Fast Ethernet and 2 Gigabit Ethernet ports
- Wiring closet/building switch: 80 Fast Ethernet, 8 FDDI and 4 Gigbit Ethernet ports
- Campus/data center switch: 8 Fast Ethernet and 14 Gigabit Ethernet ports

Cisco sweetens IP switching pot

Tag Switching to optimize IP traffic flows across networks.

By Jim Duffy
San Jose, Calif.

First there was IP switching. Then came NetFlow Switching. Next week, all hail. . . Tag Switching.

Cisco Systems, Inc. will pitch its second approach to high-performance IP networking — and fire off another round at Ipsilon Networks, Inc. — when it unveils software for its routers and WAN switches designed to zip IP flows through the network.

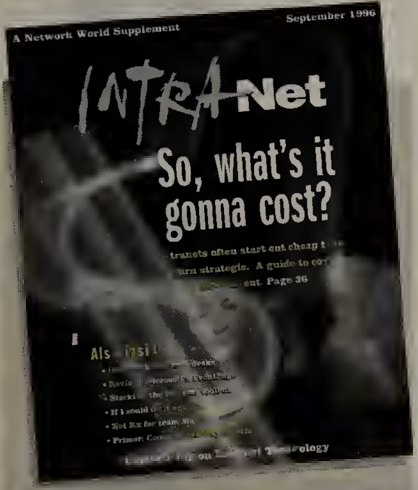
The new Tag Switching software is an enhancement to Cisco's Internetwork Operating System. The software includes a Cisco-developed protocol for tagging IP packets to associate them with a flow. It also signals the StrataCom, Inc. switch or Cisco router to assign the flow to a particular virtual circuit or route based on priority and quality of service (QoS) requirements.

"It's oriented to having the router provide quick direction to dumber switches next up the line," said Mark Leary, an analyst at International Data Corp. in Framingham, Mass.

These dumb switches, though, will require routing in-

See Cisco, *page 78*

Cisco rocks switch market with $220 million purchase of Granite. Page 8.



A Network World Supplement September 1996

IntraNet

So, what's it gonna cost?

In this issue:

- **Intranet-based help desks**
- **Review: FrontPage**
- **Our favorite tools**
- **If I could do it again ...**
- **Primer: CGI**

Starts after Page 30.

Lotus pops canned Notes Web applications

By Barb Cole
Anaheim, Calif.

Lotus Development Corp. wants choosing Notes as core Web technology to be a no-brainer, and that's just the approach it's taking to Internet applications development.

The company this week will announce a software suite designed to help companies quickly build Internet and intranet applications around its Notes-based Web server, dubbed Domino.

The new software — Lotus Internet Applications — is designed to streamline the creation of Web sites, online product catalogs and Web-based customer service systems, as well as handle the delivery of 'Net-based news to corporate desktops. It will initially appeal mainly to existing Notes customers but could interest new customers when Lotus later delivers a version of Domino not tied to Notes.

See Lotus, *page 78*

Download:

- A copy of Lotus' Domino
- A review of Domino
- A look at one firm's use of Domino

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Review Pack

Remote access in the fast lane

Ascend tops six competitors, wins World Class Award.

By Jeffrey N. Fritz

Modem speed just isn't enough for telecommuters these days. ISDN is where it's at, and there's now a range of remote access servers (RAS) that let you support a host of popular protocols over ISDN lines. We looked at seven ISDN RAS devices. The clear-cut winner based on interoperability, documentation and ease of configuration is Ascend Communications, Inc.'s Max 1800. The 3Com Corp. AccessBuilder 4000 and the Network Express, Inc. NE-1000 are runners-up. If you can handle Cisco Systems, Inc.'s Internetwork Operating System (IOS), the 4500 may be a contender, as well. The Symplex Communications, Inc. DirectRoute DR-1 has decent functionality but needs to do better in terms of protocol support. The Shiva Corp. LanRover/E

See Review, *page 55*

Microsoft distributes its file system

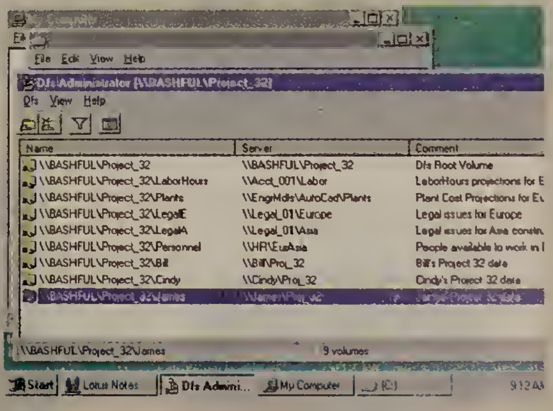
FIRST LOOK

By William Rinko-Gay

Networks are great at storing loads of files — sometimes a little too great. With so many files, finding what you want can be daunting. It doesn't help that finding files requires you to know about the structure of the network: where the servers are what the directory structures are and the like.

Microsoft Corp., IBM and Novell, Inc. are all working on dis-

See Microsoft, *page 80*



Name	Server	Comment
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\\BASHFUL\Project_32\LaborHours	\\Acct_001\Labor	LaborHours projections for E
\\BASHFUL\Project_32\Plants	\\EngrMdls\AutoCad\Plants	Plant Cost Projections for E
\\BASHFUL\Project_32\LegalE	\\Legal_01\Europe	Legal issues for Europe
\\BASHFUL\Project_32\LegalA	\\Legal_01\Asia	Legal issues for Asia constr
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This Week

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News+

- **Switching protocols:** Read our Page 1 article on Cisco's new tag switching scheme, then come online for background articles and primers on IP and NetFlow switching. **DocFinder: 9917.**
- **Switched Ethernet:** Download primers on the technology and a guide to moving your LAN to switched Ethernet. **DocFinder: 9915.**
- **Lotus Notes:** Read our review of the Domino Web server, download a copy of the software to try for yourself, and see how one Big Six accounting firm is using it to extend Notes to non-Notes users. **DocFinder: 9919.**
- **Channel-attach:** Look up articles on IBM's and Cisco's offerings in the market for linking networks to mainframes. **DocFinder: 9905.**
- **E-mail:** See what vendors have planned for the client/server IMAP4 protocol, and download protocol specs and software so you can try it for yourself. **DocFinder: 9901.**

NetRef

- **Authentication services:** Read our Buyer's Guide, download a chart with detailed product and pricing info, and look up terms and relevant Internet specs in our authentication glossary. **DocFinder: 9907.**
- **Remote-access servers:** With our review of seven servers, you'll also get a detailed features chart. **DocFinder: 9911.**

Careers

- **It's time for our monthly Network Book Report.** Follow the links to publisher sites for more info on the books we recommend. **DocFinder: 9909.**

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NetworkWorld Fusion

PICK OF THE WEEK

Hot Topic

Agree with Briere and Heckart on ATM (page 24)? Let us know. Select Forum, Columnists, then Briere and Heckart.

NetworkWorld
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NetworkWorld's *Mission: To provide news and analysis that help network IS professionals deliver the network computing infrastructure and distributed applications required to meet evolving business needs.*

News briefs, September 9, 1996

Pentagon arms itself with MCI services

MCI Communications Corp. has won a big contract to provide Synchronous Optical Network (SONET) digital cross connects, switches and other gear for the Department of Defense's new OC-3 backbone linking several hundred U.S. locations. The nine-year MCI deal, with Northern Telecom, Inc. as a major subcontractor, is worth between $88 million and $400 million.

Netscape stirs up applications activity

Netscape Communications Corp. last week launched its AppFoundry initiative to build momentum among software developers to write Web server applications in Java and JavaScript that will run on Netscape's Enterprise Server. Informix Software, Inc., Sapient Technologies, Inc. and Sage Solutions are among the 20 software developers rallying around Netscape in this effort by putting free software samplers for everything from corporate directories to sales databases online at Netscape's Web site. Netscape is also setting up newsgroups for users and developers to talk it up.

A friendly Exchange

At its Exchange Deployment Conference this week in Austin, Texas, Microsoft Corp. will promote the next version of its Exchange messaging product, now being referred to as Version 4.5. Expected to enter beta tests this month, Exchange 4.5 will support Internet protocols such as HTTP, HTML and Post Office Protocol 3. Due out by year-end, it is also expected to have improved replication and support for Lightweight Directory Access Protocol.

Trial by wire

Ameritech Corp. and IBM's Global Network group next month will begin a high-speed Internet access trial that is promising to deliver a 50-fold performance improvement for users with ordinary phone lines. The test will utilize Asymmetric Digital Subscriber Line (ADSL) technology, which dramatically enhances regular voice line performance. During the six-month trial, more than 200 users will be able to access and retrieve data from the Internet at speeds as fast as 1.5M bit/sec. There has been no word on when ADSL services may be brought to market.

Dell powers up Pentium Pro servers

Dell Computer Corp. today will launch a line of Pentium Pro servers with price tags that should raise industry eyebrows. The entry-level offering, the Dell PowerEdge 2100, costs $3,799 and is available now. Dell plans to release a mid-range and high-end server over the next two months, with prices the company claims are as much as 30% lower than other offerings. The Pentium Pro launch is part of Dell's effort to seize a major share of the network server market.

Two down, a few more to go

Digital Equipment Corp. this week is expected to announce a "long-term engineering support" agreement with Electronic Data Systems Corp. of Dallas for EDS to assume development and support of Digital's DECnet/OSI, X.25 and ISDN networking software. The agreement could involve the transfer of Digital employees to EDS, a Digital spokesman said last week. Financial terms were not disclosed. The outsourcing of DECnet/OSI, which has been expected for a long time (*NW*, May 30, 1994, page 1), mirrors a deal Digital struck earlier this year with Computer Associates International, Inc., in which Digital sold some of its Polycenter systems management operations to CA.

The Me generation

McAfee, based in Santa Clara, Calif., this week will introduce McAfee Enterprise (Me), a set of network management and security tools for use across Windows NT, NetWare and Unix networks. The suite comprises firewall, encryption, authentication, help desk and other technologies.

IBM gets small: 'Net appliance ready for users

Network Station, priced at about $700, is first in family of 'Net/intranet access devices.

By Michael Cooney
Somers, N.Y.

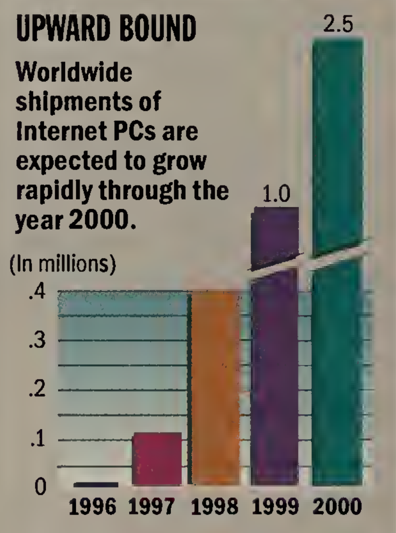
IBM last week said it will hit the market with one of the first Internet appliances for corporate customers late this fall.

IBM's Network Station is the first in a family of small, network-ready devices from the company that promise to lower overall network access and capital costs while providing quick and easy passage to Internet/intranet resources.

IBM executives said the company has other Network Stations in the works that are targeted at specific applications, such as point-of-sale or electronic commerce.

UPWARD BOUND

Worldwide shipments of Internet PCs are expected to grow rapidly through the year 2000.



SOURCE: IDC, FRAMINGHAM, MASS.

"We are targeting the enterprise commercial desktop with a device that can reduce the overall costs of a PC-based networking environment by 50% to 75%," said Phil Hester, vice president of network computing solutions at IBM.

Network Station — priced at about $700 — will conform to the Network Computer (NC) reference profile, a set of architecture features, functions and protocols that IBM, Sun Microsystems, Inc., Netscape Communications Corp. and others agreed upon as standard characteristics of Internet appliances.

Network Station is a 66-MHz PowerPC-based box with single parallel and serial ports capable of linking to Ethernet or token-ring LANs. It comes with 8M bytes of RAM, which is expandable to 32M bytes for customers that need to handle large net-based applications, but does not come with a monitor.

The device runs a microkernal-based operating system that supports Netscape Navigator 3.0. For host access, customized 3270, 5250 and Windows NT connectivity packages as well as Java programming capabilities are included.

"As a dumb terminal replacement, the Network Station has a place in large enterprises," said David Andrews, president of the D.H. Andrews consultancy in Cheshire, Conn. "The key, as it is with any new technology, is getting applications and lots of these devices deployed out there."

Potential customers see the Network Station as a tool to make everyday network administration easier.

"We spend just a ton of time on configuring, reconfiguring, updating software and other activities that interrupt productivity for devices on our LAN," said Dennis Bosma, director of management information systems with Kahler Realty Corp. in Rochester, Minn., which will be a beta site for Network Station. "We think the Network Station will eliminate all that fuss."

Network Station *allows quick and easy Web access.*

Separate from the IBM announcement, Oracle Corp. Chief Executive Officer Larry Ellison last week said the first NC-compliant device will be on the market in about a month but declined to name the vendor.

IBM's Network Station will enter beta testing during the next month or so. ■

Bay buys cable modem company, enhances its network switches

By Jim Duffy
Billerica, Mass.

Bay Networks, Inc. last week gave a $59 million endorsement to the nascent cable modem market by agreeing to acquire LANcity Corp.

While these fast digital modems may be the future for accessing the Internet, Bay has also set its sites on intranets and is unveiling enhancements to its Centillion and Systems 5000 switches specifically for that market.

Cable modems link homes, offices, educational institutions and similar organizations to the cable television infrastruture for high-speed Internet/intranet access and telecommuting. Cable modems are capable of access speeds up to 1,000 times those of traditional analog modems, Bay said.

According to market research firm Dataquest, Inc., 59 million U.S. households currently subscribe to cable, with a forecasted growth of cable modem deployments from 25,000 units in 1996 to 1.77 million units in the year 2000.

By combining LANcity's cable modems with its routers, hubs, switches and remote access gear, Bay is looking to offer cable service providers an end-to-end data internetworking system. Bay's recently announced 5000MSX platform will serve as the integration point for all of these technologies, said Bruce Sachs, executive vice president of Bay's Internet/telecom business unit.

Sachs said Bay will have the

See Bay, page 80

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Novell looks to change image

In wake of Frankenburg's departure, company re-energizes marketing efforts.

By Christine Burns
Orem, Utah

Judging by Novell, Inc.'s reaction to the abrupt resignation of Robert Frankenberg two weeks ago, the beleaguered network giant's principal problem is one of perception.

Within days of Frankenberg's departure, Novell officials hurried forward an aggressive marketing plan designed to buff up the company's image. The strategy calls for unifying the company's marketing message and doubling the advertising budget to $100 million through fiscal 1997 to tout the intranet merits of Novell's top three products.

NOVELL'S NEW MARKETING SCHEME

Steve Markman, executive vice president of Novell's Product Group, will lead his company on a new and improved marketing march that involves:

- **A unified message centered on IntranetWare, GroupWise and ManageWise as the Intranet platform**
- **A $100 million advertising campaign in trade publications, online services and mainstream business magazines**
- **More prominent positioning of the Novell brand name on Individual products**

DAVID POWERS

Markman

Indeed, it was lack of focus and direction that resulted in an exodus of top Novell executives this summer. More than a dozen marketing and public relations directors have left Novell in the past six months. Novell lost its vice president of corporate marketing and product marketing directors in its Internet Infrastucture, Internet Commerce, Management Products and Communications Products divisions.

"Being there was like being caught in a really unfocused whirlpool and it came down to the question, 'Hey, do I really want to spend the next five years spinning around trying to fix Novell?' " said one marketing manager who recently left for greener pastures. "There are a lot of people who answered no to that question. It is a headhunter's haven over there."

Said another former Novell marketing director who requested anonymity: "The frustration that has really caused the hemorrhaging of marketing people lies in upper management not recognizing the obvious direction toward the Internet and then not being able to turn the boat quickly enough to catch that wave."

Mark Griffiths, who left Novell last week to become the director of software product marketing in Cisco Systems, Inc.'s newly formed Internet Business Unit, said he is excited to move to a company with a well-defined Internet strategy.

"Cisco has a very strong direction and a very strong leader in [President and CEO] John Chambers. They have 80% of the routers out there on the Internet, and helping expand that business on the software side is going to be a big challenge for me and a great opportunity," Griffiths said.

Others who left Novell expressed concerns that competition between company divisions resulted in a disjointed corporate message.

"All the divisions were building up their individual businesses" and these efforts were not synchronized, so people outside were not aware of the company's strengths, said Doug Kernan, former director of product marketing in Novell's Communications Division. Kernan left Novell in June to become vice president of marketing at Semaphor Communications, Inc. in Fremont, Calif.

The new plan is intended to create a unified marketing front and clearly spell out Novell's take on the intranet.

MARKETING EXECS MOVE AWAY FROM NOVELL

Amid complaints of a disjointed marketing vision and the lure of start-up opportunities, many marketing officials have recently left Novell.

Executive	Postion at Novell	Departure date	New position
Steve Dauber	Director of product marketing, Management Products Division	April	Vice president of marketing, MediaWay
Mark Griffiths	Director of product marketing, Intemet Commerce Division	August	Director of software product marketing, Cisco's Intemet Business Unit
Christine Hughes	Senior vice president of corporate marketing	July	Unknown
Doug Kernan	Director of marketing, Communications Product Division	June	Vice president of marketing, Semaphore Communications
Micheal Nelson	Director of strategic communications	August	Senior director of product marketing, Pretty Good Privacy
Michael Ober	Director of product marketing, Intemet Infrastructure Division	April	Unknown

According to Steve Markman, executive vice president and general manager of Novell's Product Group, Novell's revamped marketing plan focuses strictly on IntranetWare, GroupWise and ManageWise. The company's intention is to convince its users that, together, these three products provide a solid intranet platform.

"This is the message you will see in our ads, in our press releases, in literature. We will put everything we can behind this [message]," Markman said.

Joe Rodrigues, worldwide director of advertising, said Novell will spend $20 million per quarter through fiscal 1997 to drive home the message. This represents a 100% increase in the company's advertising budget, Rodrigues said.

Industry observers said for Novell to compete with Microsoft Corp. in the booming intranet applications server arena, the network operating system giant must convince CEOs and top-level IT professionals that its mindset goes beyond NetWare. If Novell's new story is not articulated clearly enough at this level, analysts argue users will rip out NetWare in favor of a more intranet-savvy platform.

"Until recently, Novell has been virtually silent on this issue and Microsoft has got a great hold on the mind share," said Peter Rubicam, first vice president and senior equity analyst with Dean Witter Reynolds in New York. "While they still need a strong evangelist at the top, I think they are moving in the right direction with this push." ■

Cisco snaps up Granite Systems for $220M

By Jim Duffy
San Jose, Calif.

Cisco Systems, Inc. last week gave its customers another reason to delay moving to ATM by agreeing to acquire Gigabit Ethernet start-up Granite Systems, Inc. for $220 million in stock.

Cisco's intent in acquiring the Palo Alto, Calif., company is to give customers a wider choice of backbone network technologies. Gigabit Ethernet switching may help alleviate traffic congestion on network backbones resulting from a growing number of end users, bandwidth-hungry applications such as multimedia, Internet access and groupware, and higher performance servers, according to Cisco.

The high-speed technology may also help to keep Cisco's routers around a little while longer. ATM switches, too, are supposed to alleviate traffic congestion and handle multimedia applications, but they do not require routers for interconnecting ATM LAN segments.

"Gigabit Ethernet is the best thing to happen to Cisco," said Esmeralda Silva, a senior analyst at International Data Corp. in Framingham, Mass. "It keeps on delaying the migration away from routers."

For this reason, Gigabit Ethernet will become Cisco's "strategic" backbone technology, according to brokerage firm Montgomery Securities, Inc. in San Francisco. Cisco maintains that it is just offering customers a choice.

PROFILE: GRANITE SYSTEMS

Founded:	1995 by Sun Microsystems and Stanford University officials
Products:	Gigabit Ethernet ASIC switching engines
Management:	Andy Bechtolsheim, chief executive officer
Employees:	50

"For those who have installed a lot of Ethernet to the desktop, Gigabit Ethernet is going to be a great, scalable aggregation point," said Jayshree Ullal, director of marketing for Cisco's Workgroup business unit. ATM's appeal is in the wide area, where users are upgrading old X.25 infrastructures and integrating voice, video and data over a single pipe, she said.

Nonetheless, Cisco will continue to offer its ATM workgroup and campus backbone switches, and ATM uplinks on its frame switches, Ullal said.

Granite Systems Chief Executive Officer Andy Bechtolsheim — one of Sun Microsystems, Inc.'s founders — has a reputation as an ATM basher. Now that he'll be working for Cisco, his tune will have to change.

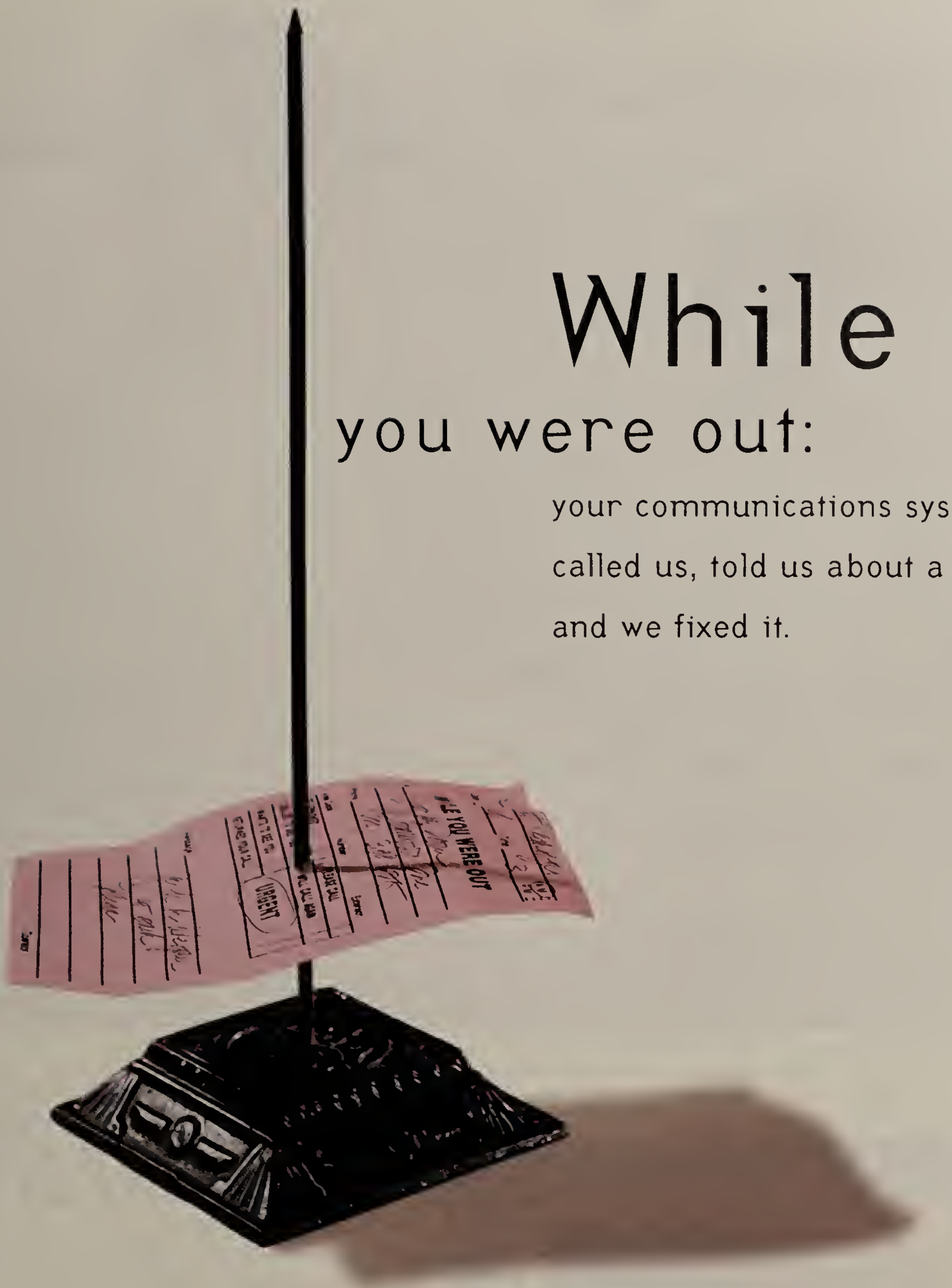
"They told me I can be passionate but nonreligious," Bechtolsheim said.

The catch is Granite is not even shipping products.

Some observers expected the company to release products in mid-1997, but Bechtolsheim characterized those expectations as rumors.

So Cisco essentially paid $220 million for Bechtolsheim, his Application Specific Integrated Circuit designs and the 50 employees to build products for a market that research firm Dataquest, Inc. expects to account for multibillions of dollars before long.

Bechtolsheim will become a vice president of engineering within Cisco's Workgroup business unit. ■



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Reach is back with revised workflow tool

By Barb Cole
Sunnyvale, Calif.

A pioneer in the workflow software arena — thought by many to be defunct — is gearing up to ship workflow software that plugs into popular network applications.

Reach Software Corp. is back, and next month will ship Workman 2.1. The software adds workflow capabilities to Microsoft Corp.'s Windows 95 and Exchange, Web browsers and PC DOCS, Inc.'s DOCS Open document management system.

Reaching for success

- **1990** - Reach is founded.
- **1993** - Reach ships first release of its Workman workflow software.
- **1994** - Workman technology is licensed to Delrina.
- **1995** - Company and core workflow product are refocused.
- **1996** - Reach forms partnerships with Microsoft and PC DOCS; Workman 2.1 slated to ship in October.

The company's earlier workflow offering was similar to systems offered by Action Technologies, Inc. and Viewstar Corp. that are aimed at building stand-alone workflow applications and involve lots of custom coding.

Workman 2.1, however, bolts onto existing applications with little programming and only minor changes to some system files.

In addition, while most workflow systems ride on either an existing messaging engine or database, Workman 2.1 uses a mail server for messaging and an Open Database Connectivity (ODBC)-compliant database for tracking. This hybrid approach allows users to receive new work in a familiar mail client, but provides the scalability typically associated with a relational database server, said Arnand Jagannathan, Reach's president and founder.

The software could be used to provide routing and tracking of files, documents and URLs across a Windows network or to add workflow to Exchange or DOCS Open.

Workman 2.1 has several components, including a client-based tool for setting up workflows, a client-based workflow engine that provides the workflow services, and client-based routing and tracking agents that interface with applications and deliver work to desktops. In addition, server-based agents may be installed for tracking distributed workflow applications.

One Reach customer said he liked the fact that applications built using Workman 2.1 were easy to modify.

"Most [workflow] products are tailored for high-volume processes that are very static, but we work in a business where every sale is unique," said Lawrence Chew, a systems analyst at the Farinon Division of Harris Corp., a Redwood City, Calif., maker of microwave radios that is beta testing a sales-order processing application built with Workman 2.1.

Reach's *Jagannathan says Workman provides scalability associated with databases.*

Pricing for Workman 2.1 is $300 per user; $995 per server for the server status agents; $995 for the Workmap designer tool; and $3,995 for a Workman developers' kit for building custom agents.

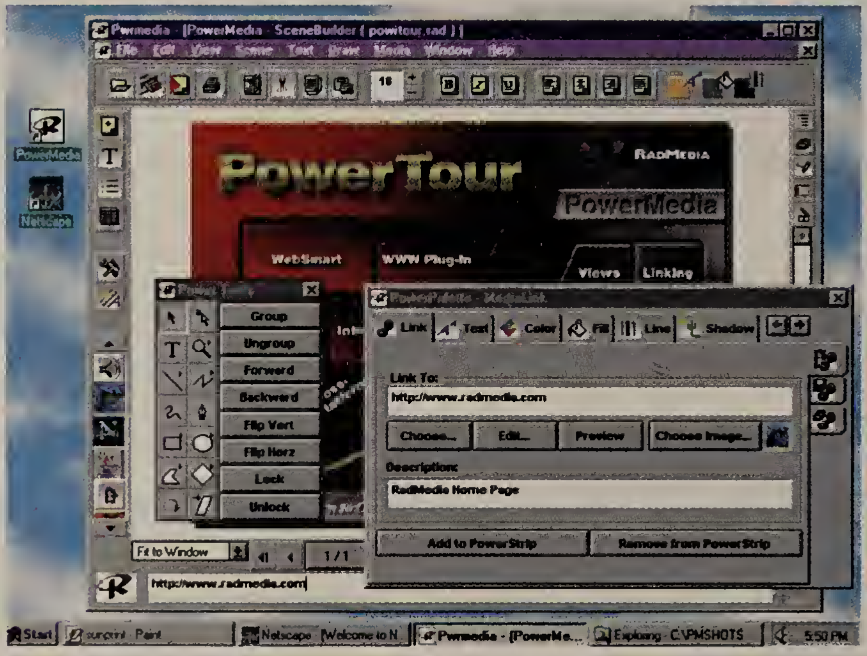
©Reach: (408) 733-8685.

RadMedia serves new Web tool in two flavors

By Ellen Messmer

RadMedia, Inc. next week begins shipping two versions of PowerMedia 3.0 — one for basic Web publishing and the other for large-scale multimedia presentations.

PowerMedia Pro lets you publish in Java and HTML formats. PowerMedia Office, which uses the proprietary RadMedia and Adobe Acrobat formats, is aimed at large companies that want to create revisable documents for multimedia presentations.



Link To: http://www.radmedia.com

Description: RadMedia Home Page

http://www.radmedia.com

RadMedia *is expanding its repertoire with a new group of Web presentation tools.*

With PowerMedia Pro, which conforms to the World Wide Web Consortium's HTML 3.0 standard, users can combine Java applets with HTML content, sound and video. The Office version does not publish in HTML but does enable full-screen presentations over the Web in the .rad format, controlled by a PowerMedia viewer.

Available for both Windows and Macintosh, Pro is priced at $495 and Office at $295.

Rad future

This week, RadMedia unveils its future product direction with technology it calls Tsunami.

Based on Java, the Tsunami architecture will provide the basis for a future version of PowerMedia that can deliver LiveDoc (formerly known as OpenDoc) active content. These LiveDoc objects can support streaming multimedia presentations.

"With Tsunami, you can publish a PowerMedia presentation as a Java applet," RadMedia President Jeff Morgan said. "It will be a way to get high-end graphics over the Web."

RadMedia plans to have the Tsunami version of PowerMedia for Unix, Windows and Macintosh out by October.

©RadMedia: (888) 723-6334.

IP routing

Ascend cuts in on Cisco

By Tim Greene
Alameda, Calif.

Ascend Communications, Inc. next week will introduce a 4G bit/sec router that it claims can keep corporate IP networks from bumping against the ceiling speeds of their current backbone routers.

The modular GRF 400 — based on technology obtained through Ascend's acquisition of NetStar, Inc. earlier this year — will make its debut at NetWorld+Interop 96.

According to Ascend, the device addresses two major sources of router bottlenecks: router table lookup and overloaded central CPUs.

GRF 400 routing tables are cast in hardware on each interface card that fits into the chassis, allowing lookup speeds of 1 to 3 microsec, which the company says is 100 times faster than conventional routers.

In addition, the box has a 4G bit/sec backplane that supports up to four interface cards, each of which has a 1G bit/sec interface with the backplane. A fifth control card houses the backplane and contains the master routing table, which updates tables on each interface card as often as 50 times per second.

One possible drawback: The device only handles IP traffic so it would need separate gateway devices to move other types of traffic such as IPX.

Ascend designed the switch for Internet service providers to relieve brownouts caused by overloaded routers. But it could also be used at the edge of corporate sites to connect servers and LANs to an IP, ATM or Synchronous Optical Network (SONET) wide-area backbone.

"Most router vendors are trying to solve those problems with software upgrades. Ascend is trying to solve it with hardware, and it is yet to be seen whether it can do it," said Liza Henderson, broadband consultant with TeleChoice, Inc., a consultancy in Verona, N.J.

Mike O'Dell, vice president, chief scientist at UUNET Technologies, Inc., said he will test the device in a real-world ISP environment and measure its interoperability with other vendor's gear.

O'Dell said the GRF 400 challenges router giant Cisco Systems, Inc., because of its speedy backplane, which is almost twice as fast as the Cisco 7500's 2.1G bit/sec backplane, and because Ascend has the corporate resources to support the product.

Five GRF 400 interface cards are available now: eight-port Ethernet, four-port FDDI, two-port High Speed Serial Interface, two-port OC-3c ATM and one-port High Performance Parallel Interface.

A two-port OC-3c SONET interface is scheduled for delivery in the fourth quarter, and an OC-12c ATM card is due in the first quarter of 1997.

The price for a fully-configured box is $90,000 to $100,000.

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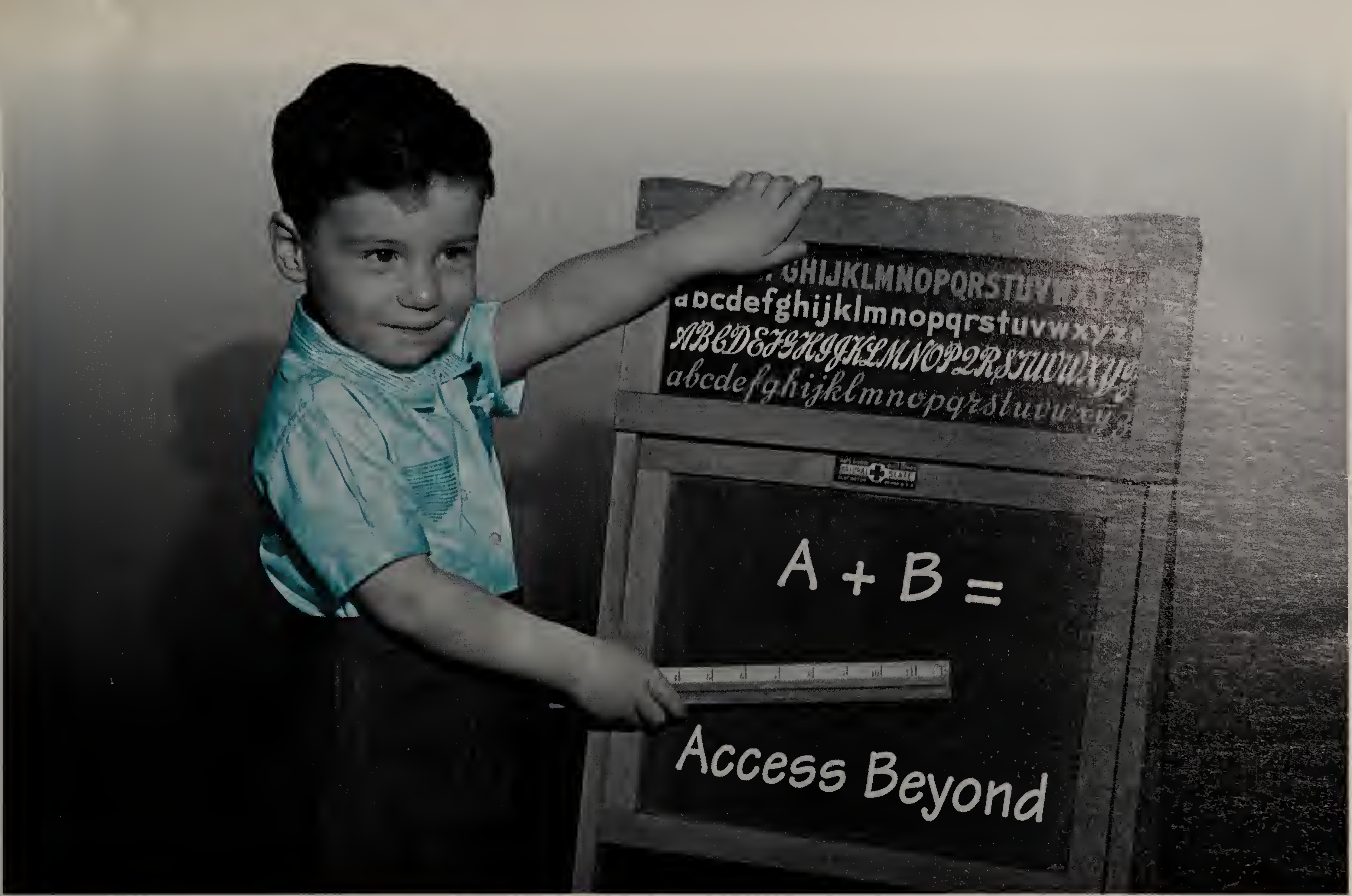
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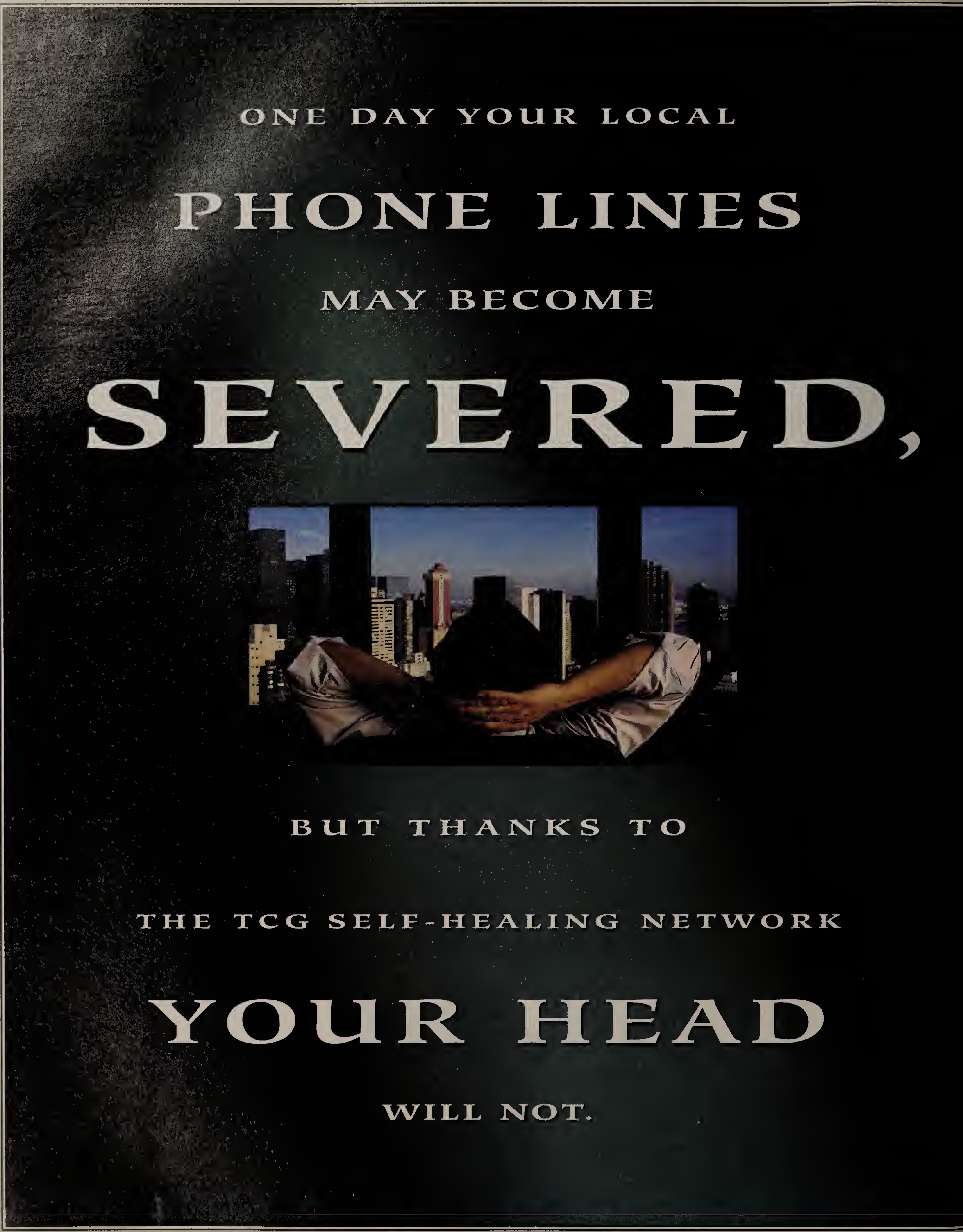

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IBM to make good on ATM migration promises

By Michael Cooney
Raleigh, N.C.

IBM this week will finally nail down one of the key components in its effort to help users more easily migrate multiprotocol LAN environments to ATM.

As expected, the company will announce its Multiprotocol Switched Services (MSS) server, along with client software that will enable users to tie new ATM workgroups and existing LAN networks to high-speed ATM backbones. MSS controls the routing and bridging functions of devices at the edge of an ATM net and provides traffic control and congestion management of backbone switching components.

Experts said getting MSS out the door will go a long way toward convincing users of legacy applications and equipment to migrate to a switched environment.

MSS will be the key controlling mechanism in IBM's ATM Switched Virtual Networking environment. SVN is IBM's overarching architecture for building and managing ATM nets. Its biggest component to date has been the Network BroadBand Services software, which runs IBM's Nways switches.

And while the new MSS server will initially be a stand-alone box, it will ultimately become a module in IBM's 8260 hub. MSS technology will also become part of IBM's switch family, including the Nways 2220 and the 82xx line. In addition, it will be integrated with IBM's 3172 gateway, 3746 front-end processor and LAN adapter cards (*NW*, Jan. 22, page 1).

The MSS server and client software being announced this week will add IBM-enabled hooks such as the ability to switch ATM LAN emulation traffic between multiple servers, sources said. An application to manage the MSS environment is also expected. Most experts said getting MSS out the door and into products will go a long way toward convincing users of legacy applications and equipment to migrate to a switched environment.

IBM has been talking about MSS for almost two years now, and with precious little product to show for it.

The process could slow down even more now that IBM faces the task of integrating MSS functionality into a ton of non-IBM equipment it has recently brought into its fold.

For example, IBM recently partnered with Xylan Corp. to utilize its OmniSwitch and PizzaSwitch switches. IBM's core Nways switches are made by Cascade Communications Corp. and various other equipment is provided by Sync Research, Inc., 3Com Corp. and others. All of this non-IBM equipment will need to be outfitted with MSS in the future to play in the SVN environment.

MSS does, however, have the support of other major players in the industry. For example, Network Interoperability Alliance members 3Com and Bay Networks, Inc. have endorsed MSS as a technology they will include in future products.

The MSS server and client software are due to ship by year-end. ■

Sourcecom to be first with ADSL concentrator

By Tim Greene
Westlake Village, Calif.

The ability to deliver broadband services over conventional phone lines will inch closer to reality when Sourcecom Corp. next month ships the first Digital Subscriber Line Access Multiplexer (DSLAM) to aggregate customer ADSL traffic onto carrier trunks.

Other vendors, including Ascend Communications, Inc., Cascade Communications Corp. and Cisco Systems, Inc., are developing DSLAMs by adding Asymmetric Digital Subscriber Line interfaces to existing products such as routers.

But the attraction of Sourcecom's BANC 6000 is its ability to work with a variety of carrier infrastructures, including frame relay, ATM and Synchronous Optical Network (SONET), according to Larry Tiedt, director of enterprise network design for GTE Corp.'s telephone operations division.

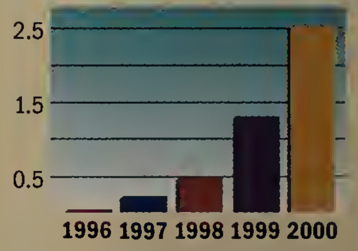
The device also eliminates the need for Ethernet switches and stand-alone routers as used in ADSL trials such as the ones run by GTE. In those trials, the central office ADSL modems used to support customers are wired to an Ethernet switch, which is connected to a router linked to an Internet service provider.

The BANC 6000 would replace the Ethernet switch and the router. Aggregated traffic from the modems would be dumped directly into carrier backbone switches through either frame relay modules, which each support two 8M bit/sec ports, or an OC-3c ATM module.

ADSL TO THE MILLENNIUM

Revenues for ADSL equipment will grow steadily over the next four years.

(In millions of dollars)



SOURCE: DATAQUEST, SAN JOSE, CALIF.

The device also incorporates Ipsilon Networks, Inc. IP switching client, allowing the BANC 6000 to establish connections across ATM/IP backbones.

The BANC 6000 still relies on a separate modem bank to interface with individual users' phone lines, but that is not a drawback yet. ADSL modem technology is still in a shakedown period, and integrated modems will not be required until an industry standard is set, Tiedt said.

Each BANC 6000 box supports 32 ADSL subscriber ports on a 1G bit/sec backplane. Each port can handle up to 12M bit/sec and, through negotiations with individual ADSL modems in the rack, those 12M bit/sec ports can be divided into any size upstream and downstream paths at which the modem is configured to operate.

The 32-port chassis costs $19,950. The dual frame relay module costs $3,450, and the OC-3c ATM module costs $5,950.

©Sourcecom: (818) 735-3505.

Use of electronic cash to soar

By Rebecca Sykes

By the year 2000, the number of electronic payment transactions will reach 9 billion and continue to soar, according to a new study by financial researcher Killen & Associates.

In 1995, there were 1 billion electronic cash transactions, and by 2005, that number will surge to 30 billion, officials said.

"The thing that will drive E-cash on the Internet is micropayments," said Jules Street, vice president of the Palo Alto, Calif.-based research company.

Micropayments are the small amounts consumers pay for services or information, add up to big money and, if processed in traditional ways, are labor-intensive and expensive for companies.

For instance, a consumer might elect to receive reports and stock quotes each day on certain investments, Street said. The charge for the information is slight, but keeping track of the consumer's choice and charging for the service is costly, he said. People use the Internet to purchase not just big-ticket items, but information and services as well, and E-cash helps make that practical, according to Street. "It's a less expensive alternative to most of the payment services that are available," Street said.

The exact form E-cash will take remains to evolve but could include desktop card readers akin to those used by stores to check the validity of customers' credit cards. Consumers would purchase a card that they would run through the reader, subtracting value from the card to purchase assorted services, Street said. Alternatively, consumers could purchase value from companies with whom they already do business, storing the value with the company, which would subtract from it based on the customer's activity, he said.

Security will remain an issue for some, but Street was confident E-cash will triumph.

"It took a while for people to accept that checks are money," Street said. "It's just a matter of time before we have a diminution of this security issue."

Sykes is a correspondent with IDG News Service in Boston.

Netscape's Chairman Clark attacks Microsoft's ActiveX

By Terho Uimonen
Chiba, Japan

Netscape Communications Corp. Chairman Jim Clark last week upped the ante in his company's crusade against Microsoft Corp. by urging people to stop developing software for the Redmond, Wash.-based company's ActiveX specification.

Clark *urged developers to eschew ActiveX.*

Microsoft will take over the Internet if its ActiveX specification wins the battle against Sun Microsystems, Inc.'s Java programming language and becomes the developers' choice for writing applets for the World-Wide Web, Clark said in a keynote speech at World PC Expo 96 here.

Clark said that would allow Microsoft to control the Internet, which he described as the multimedia telecommunications platform of the future.

"If Microsoft is successful [with ActiveX], then Microsoft will own the telecommunications system in much the same way as they now own the desktop," he said. "So it's very, very important for people to realize that and not embrace ActiveX — unless Microsoft actually makes it public domain."

Clark's remarks marked the latest development in the ongoing battle between the two companies over the 'Net software market.

In a recent eight-page letter to the U.S. Department of Justice, Netscape alleges Microsoft uses anti-competitive methods in promoting its Internet Explorer browser software.

Netscape, which charges $49 for its market-leading Navigator browser, said Microsoft's bundling of Explorer for free with Windows 95 and NT is unfair. Microsoft refuted the charges, calling it "a publicity stunt."

Uimonen is a correspondent with IDG News Service.

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Yurie pours data through clogged pipes

By Tim Greene

Lanham, Md.

There's a name you might not have heard of in ATM access. Yurie Systems, Inc. this month will ship an ATM access concentrator that can maintain throughput across even congested WAN links, allowing users to get by with less bandwidth.

Yurie, named after the company president's daughter, will ship the LDR200, an ATM access concentrator that cuts voice, data and video into ATM cells.

WHO'S YURIE?

Founded in 1992, Yurie Systems, Inc. is just now seeking commercial clients.

Based:	Lanham, Md.
No. of employees:	80
Revenue:	$10 million (first half of 1996)
Products:	LDR200 and LDR100 ATM concentrators
Primary market:	U.S. Military
New market:	Large corporate users, carriers

The company has started out building military applications that demanded pumping large amounts of data down small, unreliable pipes. In one U.S. Army application, a smaller, earlier device called the LDR100 was used to blend military phone and ATM Transparent Asynchronous Transmitter/Receiver Interface (TAXI) traffic from a Sun Microsystems, Inc. workstation onto a 1,024K bit/sec radio channel. Other solutions the Army had tried dropped the voice channels when those boxes became congested, according to Frank Halloran, an Army electronics engineer at Ft. Monmouth, N.J.

Al Spiegleman, principal with A&M Consulting in Evergreen, Colo., said the Yurie device makes it practical for users to set up private wide-area ATM networks because they can get so much legacy traffic down relatively small dedicated lines. "This is the first product that makes ATM practical for the forgotten 100,000," Spiegleman said.

Yurie's proprietary prioritization divides traffic into two categories: delay-sensitive and loss-sensitive. Voice traffic, for example, is delay-sensitive, but not necessarily loss-sensitive. If some cells are lost, the voice signal can still be intelligible. By contrast, TCP/IP traffic is disrupted if cells are lost, but can be delayed with the transmission still being understandable.

Yurie has four delay-sensitive levels and six loss-sensitive levels for prioritizing traffic. It also buffers traffic in each interface card in a Yurie chassis. The buffers vary in size depending on the type of traffic the card handles. An aging algorithm tracks how long cells have been in a buffer and sends them out or drops them as appropriate to deal with congestion.

The LDR200 comes in a 12-slot and a 16-slot model, with wide-area interface modules including T-3, T-1, serial data and OC-3c, and will ship within 45 days.

Additional WAN interfaces, ISDN Primary Rate Interface, analog voice, parallel data for satellites, E-1 and E-3 will ship in the fourth quarter. User access interfaces include ATM TAXI and OC-3c. An Ethernet card is due by year-end.

The price for an LDR200 ranges from $30,000 to $90,000.

©Yurie: (301) 352-4600.

CORRECTIONS

A product brief in the Sept. 2 Client/Server Applications section incorrectly described Open Port Technology's AFD product, which is a fax distribution application for processing inbound faxes.

Scott Bradner's Sept. 2 Internetworking Monitor column (page 21) contained an incorrect URL. The correct URL is http://www.cygnus.com/~gnu/swan.html.

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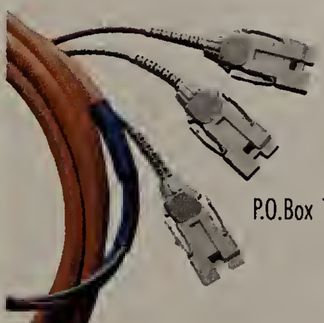

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Circle Reader Service #49

Intel targets PC configuration

By Christine Burns
Hillsboro, Ore.

Intel Corp. this week will announce a combination software and hardware product that will let administrators configure new PCs across an enterprise network and simplify the upgrading of existing PCs to 32-bit operating systems.

Company officials claim this utility, which will be packaged as a stand-alone product within the company's LANDesk line, will greatly reduce the cost of managing desktop machines and give administrators control over which operating systems and applications run on those PCs.

According to Linda Bonder, director of marketing for Intel's networking division, this new product consists of both a server and a client component.

The configuration management server is a management console with tools that allow an administrator to create and store PC configurations for the network machines. The agent software resides on a floppy disk, which has to be inserted into a PC before it is turned on. It forces the PC to boot up from the configuration server, which downloads the appropriate software to the PC. While the product will not be generally available until later this year, a prototype will be demonstrated at the Intel Business Computing Forum in New York on Sept. 24.

Intel President and CEO Andy Grove will demonstrate his company's new centralized PC configuration technology at a desktop management forum hosted by Intel in New York on Sept. 24.

Ray Paquet, senior research analyst with Gartner Group, Inc. in Stamford, Conn., said 80% of the total cost of desktop machines is incurred from managing them. "By giving administrators a way to install and upgrade operating systems from one central place, that cost is going to be significantly reduced," he said.

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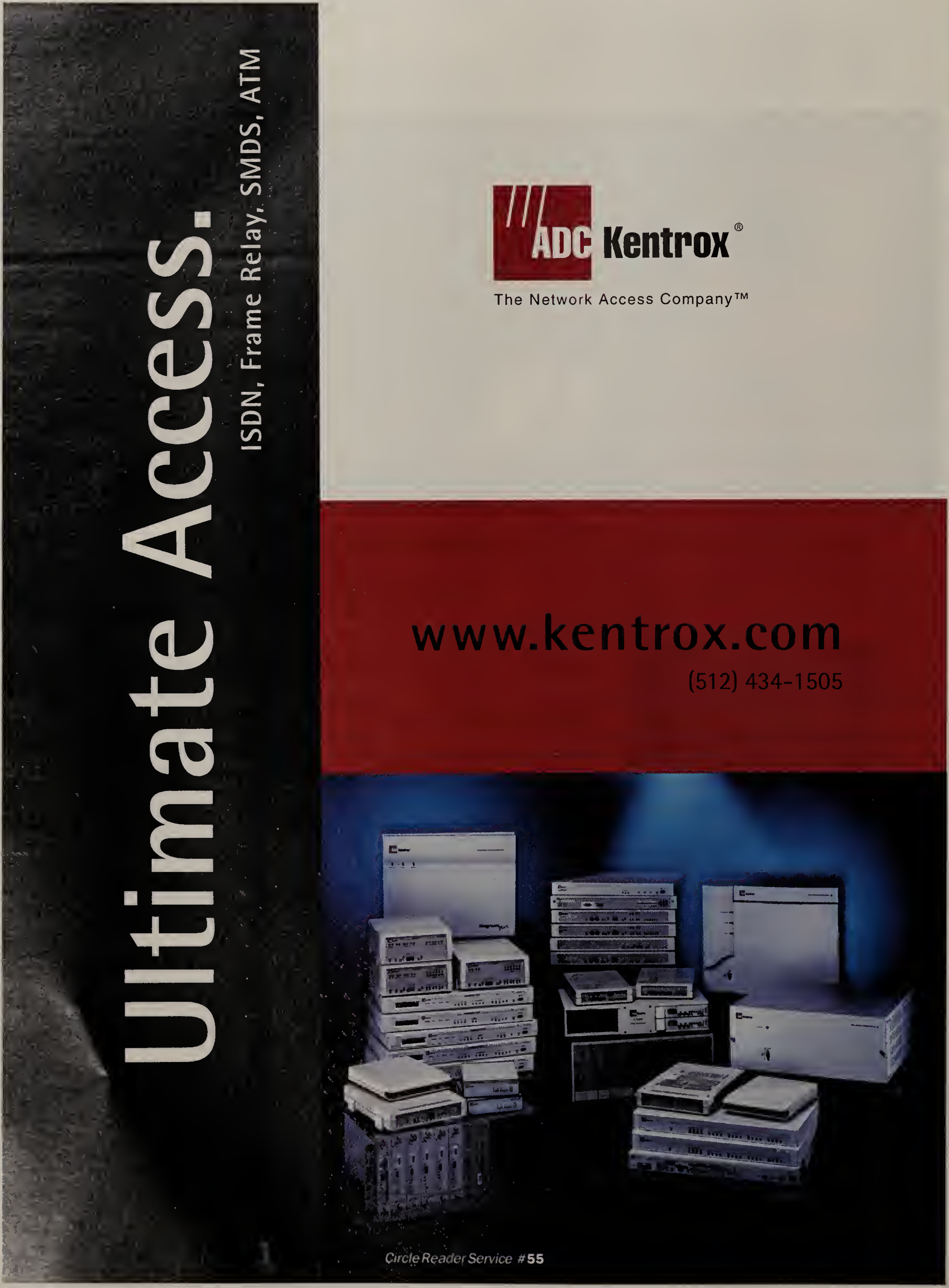
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Circle Reader Service #55

Proteon secures 'Net access routers

By Jim Duffy
Westborough, Mass.

Proteon, Inc. next week is expected to roll out a security enhancement for its GlobeTrotter remote access routers at NetWorld+Interop 96 in Atlanta.

Called GTSecure, the enhancement comprises firewall software that will give GlobeTrotter end users secure access to the Internet and enable Internet service providers to add security to their service packages, sources said.

Proteon declined comment.

With GTSecure, analysts said, Proteon is not offering anything different from other remote access router vendors; Proteon is just offering it at a lower cost.

"Their prices are real aggressive," said Bobbi Murphy, principal analyst for San Jose, Calif.-based Dataquest, Inc.'s remote LAN and Internet access service. "Security software is becoming a commodity for network equipment vendors. Proteon's trying to reinvent themselves and carve out a niche at the very low-end consumer range, which I think is going to be real challenging because the margins are real skinny," she said.

GTSecure examines and discriminates between authorized and unsolicited network traffic and dynamically assigns access privileges on a session-by-session basis. It also automatically closes ports at the termination of a session, and monitors and registers all levels of activity for potential security breaches. GTSecure also includes the industry-standard RADIUS user authentication technology.

Two models of the GTSecure-equipped routers will be available, priced at $1,395 and $1,595, respectively. They will ship later this month.

©Proteon: (508) 898-2800.

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Briefs

■ *After a four-month delay,* **ImageNet, Ltd.** *in Israel will ship its Cane 1.0* **network design and simulation** *system this month. Features include doubling the system's component library to 7,500 devices; expanding its validation and analysis tools, including the addition of IP address and VLAN design capabilities; and improving the product's performance and user interface.*

Cane 1.0 costs between $4,900 and $20,000.

ImageNet: 972-3-5783178.

■ **Hewlett-Packard Co.** *said it will license technology from Hitachi, Ltd. in order to quickly bring to market a Windows NT implementation of* **OpenView** *Network Node Manager (NNM) 4.1.*

*Hitachi developed a Windows NT version of NNM 4.0, which it has been marketing as NETM*Cm2 NNM to the Japanese market since December. HP licensed this technology from Hitachi for an NT version of NNM 4.1, the distributed version of OpenView that began shipping in April.*

Hitachi and HP also cooperated on the design of HP OpenView OmniBack II for NT, an enterprisewide backup and restoral product. HP reiterated plans to release both products later this year but has still not disclosed pricing.

■ **Systems and Synchronous, Inc. (SSI)** *last week added Internet browser support to its 3270 SNA host emulation software.*

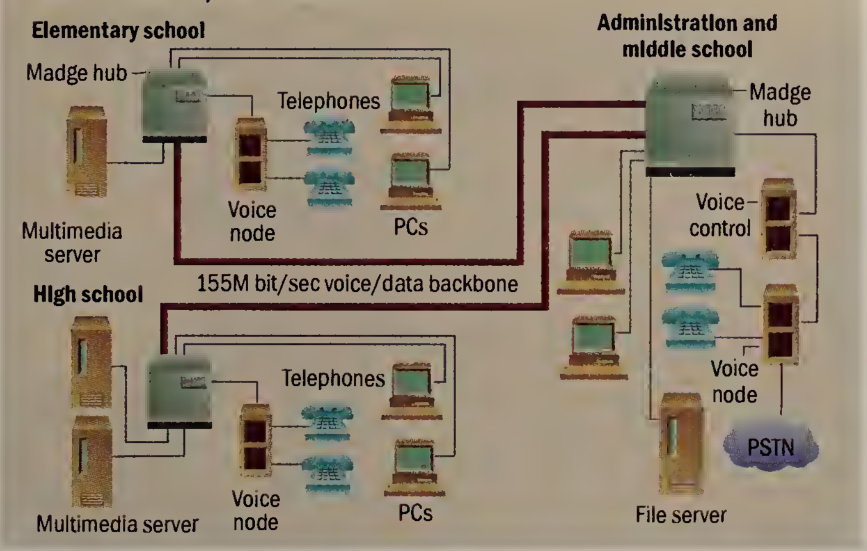
LAN Panther Internet software lets character-based 3270 terminals access World-Wide Web data and bring the text-only portions of that data back to the terminal. It also lets **3270 users** *utilize Internet E-mail functions side by side with its traditional SNA connectivity capabilities.*

LAN Panther Internet is available now for prices starting at $6,500.

SSI: (708) 505-4517.

NeVaDa in Wisconsin

How the Stoughton Area School District runs both its voice and data traffic over a 155M bit/sec backbone:



WAN architecture goes to school

By David Rohde

Stoughton, Wis.

A PBX maker's converged voice and data WAN architecture is finding takers among network managers for school districts.

Mitel Corp.'s Networked Voice and Data (NeVaDa) has been successfully trialed at the Stoughton Area School District here, the vendor announced last week. The school district — serving six schools, an administration building and public library — dumped its Centrex service and token-ring and Ethernet LANs for the new Mitel architecture.

Introduced at last spring's NetWorld+Interop in Las Vegas, NeVaDa is an extension of Mitel's existing fiber-distributed PBX in which all telephone calls are handled by a voice control module at the central location. To merge with a distributed data network, the voice control unit is linked to a Madge Networks, Inc. Ethernet switching hub outfitted with a new ATM/Synchronous Optical Network (SONET) module.

To make the network work, the user organization must agree to lease or install fiber capable of carrying a 155M bit/sec traffic stream into each premises building. The reason schools are taking the offer is that they have close relationships with municipal governments that are upgrading their physical communications infrastructures, explained Dan MacDonald, Mitel's director of product marketing.

For example, with the help of the local government, the Stoughton school district installed an 18-strand hybrid fiber — 12 single-mode and six multimode — to each site, following local voters' approval of a referendum last February.

And Mitel, a Canadian-based company that has a strong installed base among schools, particularly in the northern U.S., is finding that many of its educa-

See **NeVaDa,** ***page 20***

Bus-Tech: Out with the old, in with the new

Company buys its independence to be quicker to market.

By Michael Cooney

Burlington, Mass.

Sometimes you can control your own destiny.

In an effort to do just that while providing users with a one-stop shop for mainframe channel-attached communications, Bus-Tech, Inc. bought itself out of its ownership by Network Systems Corp. (NSC)/Storage Technology Corp. It then turned around and purchased a line of competitive channel connectivity products from Memorex Telex.

Bus-Tech picked up Memorex Telex's 9400 family of Enterprise Communications gateways, which channel-attach LANs to the mainframe. NSC bought Bus-Tech in 1993.

The moves will enable the company to move new products to market quicker, add improved WAN connectivity features and expand OEM partnerships.

"There was no synergy between NSC/Storage Technology and Bus-Tech," said Lucinda Santisario-Borovick, research manager of computer networking architectures with International Data Corp., a research firm in Framingham, Mass. "New business opportunities will open up, and Bus-Tech will benefit greatly by being on its own to service its users and its OEM partners."

BUS-TECH'S NEWFOUND FREEDOM GIVES IT THE ABILITY TO:

- Offer one-stop mainframe channel connectivity shopping
- Acquire competitive technology and make improvements
- Open up worldwide distribution channels
- Move products to market faster
- Deal with any industry OEM partner

The company has some significant OEM partners, too. Earlier this year, Digital Equipment

See **Bus-Tech,** ***page 20***

IBM punches up mid-range

By Michael Cooney

IBM last week tuned up the performance and networking capabilities of its RISC-based Application System/400s.

Through a combination of new hardware and software, IBM promises as much as a 50% increase in system performance and a 15% performance boost for TCP/IP and SNA traffic. It also plans a variety of integrated networking enhancements, such as support for Lotus Development Corp.'s Notes and Internet connections. Notes and Internet support are available on the current AS/400 models, but not the Reduced Instruction Set Computing-based boxes.

The moves give users who are now beginning to roll out the RISC-based AS/400s a full-featured, high-performance server that goes beyond the mid-range's traditional departmental role.

IBM is relying on 64-bit PowerPC-based AS/400s, introduced earlier this year, to push the AS/400 into server roles it had been too underpowered or underfeatured to handle in thhe past.

"About 70% of the AS/400s shipped by the end of the year will be RISC-based, vs. about 5% at the beginning of the year."

Glenn Van Benschoten, director of systems product management at IBM.

"The new operating system and features will help users employ the RISC-based AS/400 in electronic commerce-, network- and database-serving roles," said Glenn Van Benschoten, director of systems product management at IBM.

OS/400 Version 3 Release 7 includes integrated support for Lotus Notes, OfficeVision and Internet connectivity. The operating system supports Notes Release 4, which features the ability to integrate DB2 for AS/400 and Notes data.

The package includes IBM's 5250/HTML Workstation Gateway, which automatically converts existing AS/400 5250 terminal-based applications to HTML for display on Web browsers.

But the biggest AS/400 difference could be performance. "For users with lots of TCP/IP and APPC traffic, just by installing the new operating system they'll see about a 15% improvement in throughput," Van Benschoten said.

The new software includes support for IBM's OptiConnect feature, which lets users strap together multiple AS/400 processors. For example, users can link up to 32 AS/400 processors as a single unit that can share or distribute applications. OptiConnect today supports a maxi-

See **IBM,** ***page 20***

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Circle Reader Service #54

Systems management

Cabletron partner fills NT management coffer

By Jim Duffy

Rochester, N.H.

Cabletron Systems, Inc. is about to enhance its systems management prowess with a little help from its friend.

Cabletron business partner and third-party software developer Metrix, s.a. of Luxembourg recently rolled out an updated version of its workstation management software that features support for Windows NT Server, among other enhancements.

Cabletron resells a current version of the software, called WinWatch, as a key systems management application on its Spectrum management platform.

Features of WinWatch 2.1

- Dynamic group membership
- Self-rebuild
- DHCP client support
- Enhanced GUI

WinWatch 2.1 will bring its software distribution, license management, policy-based configuration management and remote control capabilities to Windows NT Servers. WinWatch currently supports NT desktops, as well as Windows 3.1, Windows 95, Windows for Workgroups and OS/2 clients.

But Version 2.1 will also include a number of new features, including dynamic group membership, self-rebuild capabilities, support for Dynamic Host Configuration Protocol (DHCP) clients and an enhanced graphical user interface (GUI).

"It continues to expand the repertoire of applications that Spectrum provides for systems management," said John McConnell, president of McConnell Consulting, Inc. in Boulder, Colo. WinWatch 2.1 will leverage Spectrum's inductive modeling and case-based reasoning capabilities going forward, he said.

Dynamic grouping

Dynamic group membership allows users to define policies based on hardware, software or operational status, and have WinWatch agents act on and enforce them. Spectrum will then group the system together according to the policies — for example, workstations and servers running similar software will be grouped together.

WinWatch agents will also generate events based on these policies, and administrators can then apply actions, reports or software changes to members of a policy group.

Self-rebuild is designed to protect program and configuration files, and the registry of systems. WinWatch will rebuild the configuration file if an unauthorized change has been made or if the file has been corrupted. WinWatch agents will trigger alarms and automated rebuild actions when these types of events occur, Metrix said.

DHCP support in WinWatch 2.1 will enable the software to dynamically remap Spectrum's database to account for IP address changes. DHCP servers dynamically assign IP addresses to endstations from a pool of available addresses.

Lastly, the GUI enhancements in WinWatch 2.1 will include drag-and-drop operations for file management, registry management, policy group and software distribution.

The WinWatch 2.1 GUI will also feature toolbars, and error and status messages.

WinWatch 2.1 costs $8,000 per Spectrum server and $3,000 per Spectrum client. Pricing for WinWatch agents starts at $100. All of the products will be available later this month.

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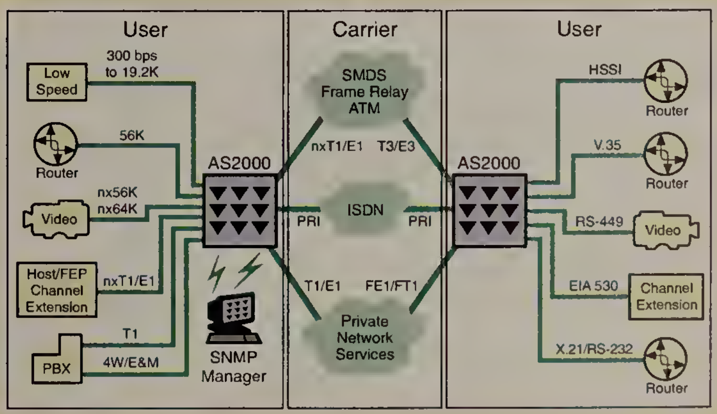

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Circle Reader Service #60

NeVaDa

Continued from page 17

tional customers are facing pressure to provide Internet access, remote library access and other new applications. To save money while doing that, they are cutting out traditional voice infrastructures, such as tie lines linking PBXs.

"By combining what were two distinctly separate operations, we were able to simplify our network and realize cost savings in the management of our overall network," said Bob Smiley, district technology director for the school district.

NeVaDa differs from other converged voice/data WANs, such as those promoted by Northern Telecom, Inc. with its Magellan Passport switches, in that an ATM/SONET module within the central Madge hub carves out a separate path for voice traffic rather than interleaving it with data traffic (*NW*, April 1, page 8).

The voice control unit at the central site acts as the brains of the distributed PBX. Telephone calls originating at the remote sites travel over the fiber net through the switching hub to the voice control unit, where they are sent out to carriers (see graphic, page 17).

The remote voice nodes have enough intelligence to feed traffic directly to back up originating telephone lines, he said. ■

IBM

Continued from page 17

mum of 13 linked processors.

The RISC-based AS/400s come in seven models; three Advanced Server models — 40S, 50S and 53S — and four Advanced Series general-purpose computing models — 400, 500, 510 and 530. The server models can support up to 200 communications lines and up to 16 LAN adapters, nearly double the existing connectivity option of today's AS/400s. In addition, the new servers can support a maximum of eight Integrated PC Server boards, also double the capacity of existing AS/400s.

OS/400 3.7 will be available in November as a free upgrade to existing 3.6 users.

✆IBM: (800) 426-2255.

Bus-Tech

Continued from page 17

Corp. announced it will use Bus-Tech mainframe connectivity products to build high-speed pipes between its servers and IBM mainframes.

Bus-Tech executives indicated Tandem Computers, Inc., Unisys Corp. and other server vendors will also combine their boxes with the DataBlaster mainframe channel interconnect boxes later this year.

The combination of Digital's AlphaServer and other server platforms with Bus-Tech's DataBlaster promises to save mainframe cycles and enable new, high-speed data mining applications.

"We are focusing on letting users move large amounts of data out of the mainframe at high speeds," according to Joe Makoid, vice president of sales and marketing for Bus-Tech. "This is becoming an increasingly big issue as more and more users link big servers with the mainframe."

The 94XX runs a customized version of Novell, Inc.'s NetWare for SAA Gateway software and Memorex Telex-developed NetWare Loadable Modules (NLM). Through the NLMs, the box can support a variety of bridging and routing features. For example, an NLM utilizes Novell's NetWare MultiProtocol Router, which supports NETBIOS, SNA, TCP/IP and IPX.

"The move gives Bus-Tech a wider variety of features to offer users looking to channel-attach LANs," said Anura Guruge, an independent analyst based in New Ipswich, N.H.

✆Bus-Tech: (617) 272-8200.

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Network World Fusion
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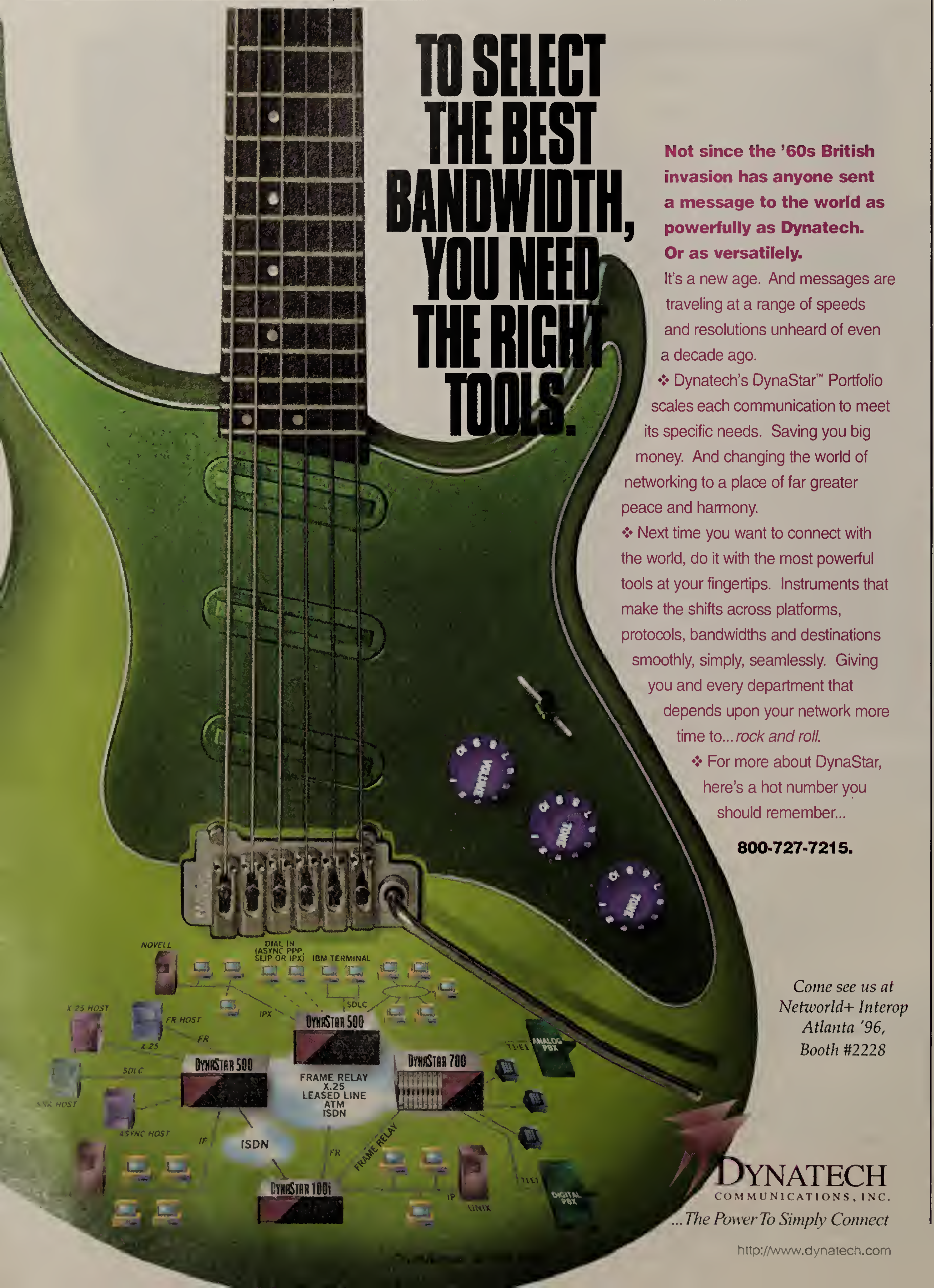

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Briefs

■ *Checking off another item in its strategy to provide competitive local switched services throughout Florida from its own facilities,* **Intermedia Communications, Inc. (ICI)** *last week introduced* **local switched services** *in the Orlando area.*

ICI brought up the same services in Tampa and Miami in June, and plans to go live in Jacksonville at the end of the year. ICI now provides local and long-distance services, international frame relay services, video, competitive access and Internet access.

■ **MCI Communications Corp.** *has introduced new* **wireless and international access** *options for MCI Mail. With the wireless option, users connect a cellular phone to a PC and dial a number for MCI's XstreamAir service, which supports certain data correction protocols.*

With the international option, users in 48 countries can go through the Concert Packet Services network, a global packet data network operated by MCI's Concert joint venture with British Telecommunications plc.

COST OF NEW MCI MAIL ACCESS OPTIONS

XstreamAir

Local number: No extra charge
800 number: 10 cents/min.

Concert Packet Services

From Canada: 6 cents/min.
From other countries: 35 cents/min.

■ **Transaction Network Services, Inc.** *will offer its customers* **wireless access** *to its network via the AirBridge Cellular Digital Packet Data services from Bell Atlantic NYNEX Mobile.*

■ **Sprint** *has announced it will market the new Overture 250 and 350* **voice-messaging servers** *from Octel Communications Corp.*

In addition, Sprint's local telephone companies will distribute the Overture PC messaging server.

Sprint readies Internet call center linkup

Carrier to harness SprintLink IP network to offer yet another way to reach a human being.

By David Rohde
Kansas City

Sprint Corp. has a new variation on the theme of allowing World-Wide Web users to coordinate their surfing with live help from a company's call center.

The carrier is testing an extension to its existing Internet Conference Center service that would allow Web users to click on a "call me now" button and be connected live with a call center agent over a separate phone line.

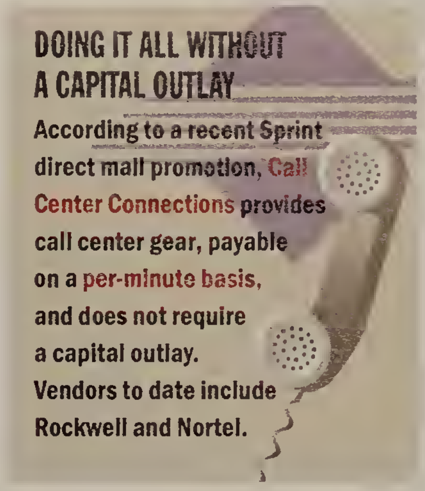
The service is being tested with users for a possible rollout later this year, Sprint officials told *Network World* last week. Although the service has not been announced and does not yet have an official name, Sprint is promoting such an Internet capability in a direct mail package aimed at business customers under the umbrella of Sprint Call Center Connections (see graphic).

Such a product introduction would plunge Sprint into an arena staked out by AT&T with its recently announced Project Instant Answer, or Project IA (*NW,* Sept. 2, page 12). But the two carriers are using slightly different approaches.

Simultaneous contact

Under Sprint's method, a Web user's call-me request goes to a server in the carrier's SprintLink IP network, explained John Williams, general manager of Sprint's Conference Line service, on which the offering is based.

The server then attempts to establish a phone connection between the Web user and a call center agent for the user-company by contacting them simultaneously, Williams said. If no agent is ready to take the call, the Web user is told to hold on in exactly the same fashion as many 800 calls.



DOING IT ALL WITHOUT A CAPITAL OUTLAY

According to a recent Sprint direct mail promotion, Call Center Connections provides call center gear, payable on a per-minute basis, and does not require a capital outlay. Vendors to date include Rockwell and Nortel.

"The consumer has their phone to their ear before the call center does," a Sprint spokesman explained.

By contrast, under AT&T's Project IA, the call-me request is first forwarded by the AT&T network to a selected agent, and an outbound call is placed to the Web user from the call center when the agent is ready.

AT&T's callback method in many ways mimics recent product introductions from makers of automatic call distributors (ACD), minus the need for installing new hardware or software. In both the ACD makers' and AT&T's approach, the Web user would receive a message to hold on — or try again later or schedule a meeting at a specific time — via the Web interface instead of the telephone.

Sprint's work on the new service evolved from its existing audioconference registration system on the Internet, known as the Sprint Internet Conference Center and accessible through the URL http://www.sprintconf.com.

But to access that site, users need a frames-capable browser, such as Netscape Communications Corp.'s Netscape 2.01b or Microsoft Corp.'s Internet Explorer 3.0 (or greater). ■

We're ready to serve large cities. . .sort of

MCI claims facilities-based local service even where it's battling RBOCs.

By David Rohde
Atlanta

TELECOM IN TRANSITION

When it comes to local telecommunications alternatives in large cities, MCI Communications Corp. has some good news and some bad news.

The good news: MCI — which announced its entry into the local market more than 2-1/2 years ago — is now claiming that it offers local service of some sort in 12 large cities.

The bad news: MCI is also complaining that, when it comes to opening markets, a number of the regional Bell operating companies serving those same cities are dragging their feet.

The key to this apparent contradiction is the qualifier that, where available, MCI offers limited facilities-based local service to businesses — in most cases meaning that MCI must have a direct bypass route into the customer premises. But to enable ubiquitous end-to-end services including switched dial tone, MCI is asking state public utilities commissions to arbitrate interconnection agreements with RBOCs.

In the most recent announcement, MCI last month said it is introducing facilities-based local service for business in and around Atlanta. The announcement added this city to the list of 11 others where MCI is claiming such availability: Baltimore, Boston, Chicago, Cleveland, Detroit, Hartford, Conn., Milwaukee, New York, Philadelphia, Pittsburgh and Seattle.

Yet on the same day, MCI appealed to the Georgia Public Service Commission to arbitrate an interconnection agreement with BellSouth Corp. The two carriers in May reached a two-year agreement setting certain terms and conditions for connecting their telephone facilities in the BellSouth region. However, the agreement did not cover the resale of local service or the purchase by MCI of unbundled local network elements to cobble together an end-to-end connection.

Under the Telecommunications Act of 1996, long-distance carriers and other new local competitors are entitled to state arbitration if voluntary negotiations fail. In fact, AT&T has requested such arbitration almost everywhere it plans to enter the local telephone business.

WHO'S FIXING MY PHONE LINE?

AT&T has pushed back its local market entry in Virginia to mid-1997, partly because Bell Atlantic won't let its technicians wear the AT&T logo on service calls.

MCI officials said they need favorable terms for resale and unbundled network elements because they are pursuing a mix of local service techniques.

"MCI is committed to providing local service throughout Georgia by building its own facilities, partnering with others to build and lease, leasing network elements from existing carriers, and reselling service," according to Kathy Pounds, MCI's regional policy director in Atlanta.

Big discounts, please

MCI officials also pointed to the Federal Communications Commission's recent decision setting national rules for interconnecting local networks as a framework for the arbitration. They even suggested that state regulators go beyond the 17% to 25% resale discount range set by the FCC as a default range.

But the recent move by several large local carriers to ask the courts for a stay of the FCC interconnection decision could slow the process (*NW,* Sept. 2, page 1). The Association of Local Telecommunications Services, an MCI ally, slammed the initial stay request by GTE Corp. and Southern New England Telephone as "self-serving" and "hypocritical." ■

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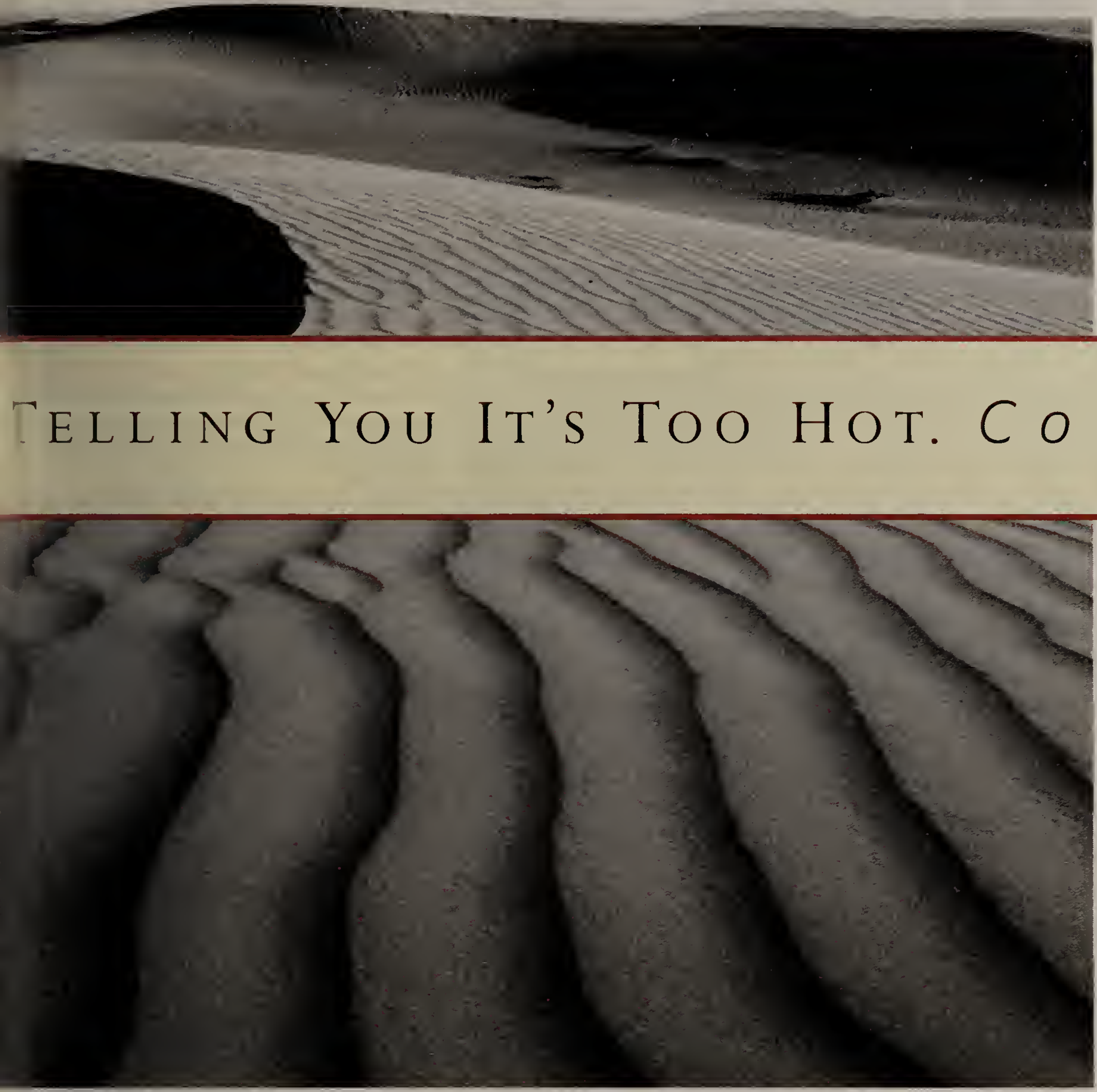

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Has It Changed Your Life Yet?

WAN MONITOR

The ever-changing face of ATM

The conventional wisdom and relative positioning of technologies in this industry changes so fast it is impossible to keep pace.

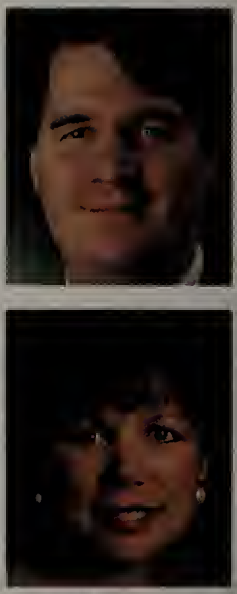
For instance, if you blinked recently, you may not have realized that multimedia is no longer the purview of ATM. A few years ago, the eventual use of ATM was a foregone conclusion for most users; it was simply a matter of where and when. But today, the questions run rampant.

Ethernet and IP clearly control the desktop. Fast Ethernet and switched Ethernet make ATM's use in many LANs suspect, even as the need for greater performance and speed increases. But IP bigots aren't satisfied with owning one small corner of the world. While the integration of multiple applications, such as voice, data and video, used to be the hallowed territory of ATM, it is no more. IP wants a piece of this pie. In fact, the whole pie would be just fine in the minds of the IP-centric. And the beliefs of the frame relay faithful are not much different.

Just as Ethernet and IP have a great deal of inertia in the local environment, frame relay has developed a large user constituency in metropolitan- and wide-area networks. And fast frame (frame relay above 1.5M bit/sec), along with frame relay's ability to support voice and video, is making it a near-term solution for companies looking to integrate networks without new investment and without ascending ATM's steep learning curve.

But don't call the coroner yet. We're not quite ready to do the postmortem on ATM, although it makes a good headline. ATM isn't dead, nor will it die. However, it probably won't evolve in the market quite like the Great Network Soothsayers have prophesied.

First and foremost, ATM will be implemented in the carrier backbone networks as an infrastructure to support frame relay, Internet and native LAN services.


Daniel Briere and Christine Heckart

The market for native ATM services will remain small and limited to the top 5% of network users — those that need very high-speed solutions to solve a bandwidth problem for a single application or to provide an integrated enterprise network solution.

For the rest of the market, the cost of access combined with ATM's complexities will keep it out of reach for a few years. During that time, ATM backbones will fill up with frame relay, IP, intranet and Internet traffic, along with a host of other application-specific services.

One big wild card in all of this is the cost of access. If it goes down, the market for ATM and other high-speed solutions could go up, fast. For instance, MFS WorldCom could become a strong data networking force and literally rewrite the rulebook.

Other providers may have no choice but to follow.

Regardless of whether ATM wins big and wins soon or takes a backseat, cooperation between the technologies is essential. There are few, if any, pundits that would paint a picture of a future dominated by only one of these technologies.

Neither end users nor carriers are willing to bet their entire future on one technology. The risk of losing is too great given the level of uncertainty. So we hedge our bets and bank on cooperation to give us a migration path between technologies and competition to drive prices lower and performance standards higher.

Briere is president and Heckart is director of broadband with TeleChoice, Inc., a consultancy in Verona, N.J. They can be reached at dbriere@telechoice.com and checkart@telechoice.com.

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Company ____________________

Address ____________________

City ____________________ State _____ Zip ______

Business phone (______) ____________________

Business FAX (______) ____________________

Internet e-mail address ____________________

If there is a parent company, please provide name: ____________________

NetworkWorld

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

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1 Industry: (check one only)

01. ☐ Manufacturers (other)
02. ☐ Finance/Banking
03. ☐ Insurance/Real Estate/Legal
04. ☐ Health Care Services
05. ☐ Hospitality/Entertainment/Recreation
06. ☐ Media/TV/Cable/Radio/Print
07. ☐ Retail/Wholesale Trade/Business Services
08. ☐ Transportation
09. ☐ Utilities
10. ☐ Education
11. ☐ Process Industries (Mining/Construction/Petroleum Refining/Agriculture/Forestry)
12. ☐ Government (Federal/State/Local)
13. ☐ Military
14. ☐ Aerospace
15. ☐ Consultants (Independent)
16. ☐ Carriers/Interconnects
17. ☐ Manufacturers (Computer/Communications)
18. ☐ Resellers of Computer/Network Products (VARs, VADs)
19. ☐ Systems/Network Integrators
20. ☐ Distributors (Computer/Communications)
21. ☐ Other *(please specify)* ____________

2 What is your job function? (check one only)

NETWORK IS MANAGEMENT:

1. ☐ Networking Management
2. ☐ LAN Management
3. ☐ Datacom/Telecom Management
4. ☐ IS, IT, MIS, Systems Management
5. ☐ Engineering Management
6. ☐ Corporate Management (CIO, CEO, Pres., VP, Dir., Mgr., Financial Management)
7. ☐ Consultant (Independent)
8. ☐ Other *(please specify)* ____________

3 What is the estimated value of networking equipment and services that you help specify, recommend or approve? (check one only)

01. ☐ $100 million or more
02. ☐ $50 mil. - $99.9 mil.
03. ☐ $25 mil. - $49.9 mil.
04. ☐ $20 mil. - $24.9 mil.
05. ☐ $10 mil. - $19.9 mil.
06. ☐ $5 mil. - $9.9 mil.
07. ☐ $1 mil. - $4.9 mil.
08. ☐ $500,000 - $999,999
09. ☐ $250,000 - $499,999
10. ☐ $100,000 - $249,999
11. ☐ None of the above

4 What is the total number of sites for which you have purchase influence? (check one only)

1. ☐ 100+
2. ☐ 50 - 99
3. ☐ 20 - 49
4. ☐ 10 - 19
5. ☐ 2 - 9
6. ☐ 1
7. ☐ None

5 Are you involved in the purchase of and/or plan to purchase network products and services?

☐ Yes ☐ No

6 Check ALL that apply in Columns A and B:

A. I am involved in the purchase of the following products/services:
B. I plan to purchase the following products/services:

LOCAL-AREA NETWORKS
A B
☐ 01. ☐ Local-Area Networks
☐ 02. ☐ Network Op. Sys. Software
☐ 03. ☐ LAN Storage/Backup
☐ 04. ☐ Optical LAN Storage/Backup
☐ 05. ☐ Disk LAN Storage/Backup
☐ 06. ☐ Tape LAN Storage/Backup
☐ 07. ☐ RAID LAN Storage/Backup
☐ 08. ☐ Network Test/Diagnostic Tools
☐ 09. ☐ Cables, Connectors, Baluns
☐ 10. ☐ UPS
☐ 11. ☐ Network Interface Cards
☐ 12. ☐ Peer-to-Peer LANs
☐ 13. ☐ SNMP Network Management
☐ 14. ☐ ATM Switches
☐ 15. ☐ Token-Ring Switches
☐ 16. ☐ Ethernet Switches
☐ 17. ☐ Remote LAN Access/Communications Servers
☐ 18. ☐ Superservers
☐ 19. ☐ File/Application Servers
☐ 20. ☐ Print Servers/Fax Servers
☐ 21. ☐ CD-ROM Servers
☐ 22. ☐ LAN Servers

INTERNETWORKING
A B
☐ 23. ☐ Bridges
☐ 24. ☐ Routers
☐ 25. ☐ Bridge/Router
☐ 26. ☐ Gateways
☐ 27. ☐ Intelligent Hubs
☐ 28. ☐ Stackable Hubs

COMPUTERS/PERIPHERALS
A B
☐ 29. ☐ Laptops/Notebooks/Sub-Notebooks
☐ 30. ☐ Micros/PCs
☐ 31. ☐ Minis
☐ 32. ☐ Mainframes
☐ 33. ☐ Workstations
☐ 34. ☐ Terminals
☐ 35. ☐ Printers/Network Printers
☐ 36. ☐ Cluster Controllers
☐ 37. ☐ CD-ROM
☐ 38. ☐ Fax/Modem Boards

REMOTE/WIRELESS COMPUTING
A B
☐ 39. ☐ PDAs
☐ 40. ☐ PCMCIA Devices
☐ 41. ☐ Wireless Data Services
☐ 42. ☐ Wireless Data Equipment
☐ 43. ☐ Wireless LANs
☐ 44. ☐ Cellular Equipment & Services

INTERNET/INTRANET
A B
☐ 45. ☐ Internet Access Service
☐ 46. ☐ Firewalls/Security
☐ 47. ☐ Web Servers

INTERNET/INTRANET (cont'd)
A B
☐ 48. ☐ Web Browsers
☐ 49. ☐ Intranet Applications/Groupware
☐ 50. ☐ Search Retrieval Products (web crawler)
☐ 51. ☐ Internet Development Tools
☐ 52. ☐ Internet Commerce Tools

SOFTWARE/APPLICATIONS
A B
☐ 53. ☐ Network Management
☐ 54. ☐ Systems Management
☐ 55. ☐ Security
☐ 56. ☐ Communications Software
☐ 57. ☐ Terminal Emulation
☐ 58. ☐ Word Processing
☐ 59. ☐ Operating Systems
☐ 60. ☐ Client/Server Applications Development
☐ 61. ☐ Database Management/RDBMS
☐ 62. ☐ Spreadsheet
☐ 63. ☐ Groupware
☐ 64. ☐ EDI
☐ 65. ☐ E-mail
☐ 66. ☐ Windows/Graphical User Interface
☐ 67. ☐ Multimedia
☐ 68. ☐ Graphics/DTP
☐ 69. ☐ Remote Access
☐ 70. ☐ Imaging
☐ 71. ☐ Server Suites (Back office, etc.)
☐ 72. ☐ Suites
☐ 73. ☐ Middleware
☐ 74. ☐ Document Management
☐ 75. ☐ Database Server
☐ 76. ☐ Site Metering Tools
☐ 77. ☐ Computer-Integrated Telephony (CIT)

WIDE-AREA NETWORK EQUIPMENT & SERVICES
A B
☐ 78. ☐ Frame Relay Equip./Services
☐ 79. ☐ Modems
☐ 80. ☐ FT-1/T-1/T-3 Multiplexers
☐ 81. ☐ FT-1/T-1/T-3 Services
☐ 82. ☐ SONET
☐ 83. ☐ Inverse Multiplexers
☐ 84. ☐ SMDS
☐ 85. ☐ Asynchronous Transfer Mode
☐ 86. ☐ Diagnostic/Test Equipment
☐ 87. ☐ DSU/CSU
☐ 88. ☐ VSAT/Satellite
☐ 89. ☐ ISDN Equipment & Services
☐ 90. ☐ PBXs
☐ 91. ☐ Voice Mail/Response
☐ 92. ☐ Videoconferencing
☐ 93. ☐ Leased Lines
☐ 94. ☐ Switched Data
☐ 95. ☐ E-mail
☐ 96. ☐ 800/900/MTS Services
☐ 97. ☐ Virtual Networks
☐ 98. ☐ Outsourcing/Systems Integration Services
☐ 99. ☐ Education/Training Services

☐ 107 ☐ None of the above (1-99)

7 Check ALL that apply in Columns A and B:

A. The following network platforms are currently installed:
B. The following network platforms are planned for purchase:

NETWORK PROTOCOLS
A B
☐ 01. ☐ SNA
☐ 02. ☐ DECnet
☐ 03. ☐ TCP/IP
☐ 04. ☐ Novell IPX/SPX
☐ 05. ☐ APPC/APPN/LU 6.2
☐ 06. ☐ NETBIOS
☐ 07. ☐ AppleTalk
☐ 08. ☐ NFS
☐ 09. ☐ IPv6
☐ 10. ☐ SNMP/SNMPv2
☐ 11. ☐ Other *(please specify)* ____________

NETWORK OPERATING SYSTEM
A B
☐ 12. ☐ Microsoft (LAN Manager)
☐ 13. ☐ Novell (NetWare 2.X, 3.X)
☐ 14. ☐ Novell (NetWare 4.X)
☐ 15. ☐ Windows NT
☐ 16. ☐ Windows NT/Advanced Server
☐ 17. ☐ LocalTalk (AppleTalk)
☐ 18. ☐ Banyan (VINES)
☐ 19. ☐ IBM (LAN Server)
☐ 20. ☐ IBM (PC LAN Program)
☐ 21. ☐ Artisoft (LANtastic)
☐ 22. ☐ Digital (Pathworks)
☐ 23. ☐ Other *(please specify)* ____________

LAN ENVIRONMENT
A B
☐ 24. ☐ 4M Token Ring
☐ 25. ☐ 16M Token Ring
☐ 26. ☐ Ethernet
☐ 27. ☐ Fast Ethernet
☐ 28. ☐ 100vg Any LAN
☐ 29. ☐ FDDI
☐ 30. ☐ LocalTalk
☐ 31. ☐ 10Base-T
☐ 32. ☐ ATM
☐ 33. ☐ Other *(please specify)* ____________

COMPUTER OPERATING SYSTEM
A B
☐ 34. ☐ DOS
☐ 35. ☐ Unix/Xenix/AIX
☐ 36. ☐ OS/2
☐ 37. ☐ OS/2 Warp
☐ 38. ☐ IBM MVS
☐ 39. ☐ IBM VM
☐ 40. ☐ Digital VMS
☐ 41. ☐ Macintosh
☐ 42. ☐ Windows
☐ 43. ☐ Windows 95
☐ 44. ☐ NT
☐ 45. ☐ Solaris
☐ 46. ☐ Other *(please specify)* ____________

☐ 47. ☐ None of the above (1-46)

8 What is your scope and involvement in purchasing decisions for network products & services for your enterprise?

A. SCOPE
(check one only)
1. ☐ Corporate/Enterprise
2. ☐ Department
3. ☐ None

B. INVOLVEMENT (check all that apply)
1. ☐ Recommend/Specify
2. ☐ Approve
3. ☐ Evaluate
4. ☐ Determine the need
5. ☐ None

9 What is the total number of LANs, workstations/nodes at this location/in your organization?

At this location:

	LANs		Workstations/Nodes
1.	☐	5,000+	☐
2.	☐	1,000 - 4,999	☐
3.	☐	100 - 999	☐
4.	☐	50 - 99	☐
5.	☐	10 - 49	☐
6.	☐	1 - 9	☐

Entire organization:

	LANs		Workstations/Nodes
1.	☐	5,000+	☐
2.	☐	1,000 - 4,999	☐
3.	☐	100 - 999	☐
4.	☐	50 - 99	☐
5.	☐	10 - 49	☐
6.	☐	1 - 9	☐

10 Please indicate your involvement in developing/implementing Internet/Intranet Technologies: (check all that apply)

1. ☐ Recommend/Specify
2. ☐ Approve
3. ☐ Evaluate
4. ☐ Determine the need
5. ☐ Implement
6. ☐ None

11 Which of the following hardware platforms are installed/planned in your company? (check all that apply)

	Mainframes	
	A – Installed	B – Planned
1. IBM	☐	☐
2. Amdahl	☐	☐
3. Cray	☐	☐
4. Hitachi	☐	☐
5. Unisys	☐	☐

	Minis	
	C – Installed	D – Planned
1. IBM	☐	☐
2. Digital	☐	☐
3. Tandem	☐	☐
4. Unisys	☐	☐
5. AT&T GIS	☐	☐
6. HP	☐	☐
7. Data General	☐	☐

What Is the total number of Servers/Clients installed/planned: (USE NUMBERS ONLY)

E-AT THIS LOCATION	#	F-% with Internet Access
1. Servers		%
2. Clients		%

G-ENTIRE ORGANIZATION	#	H-% with Internet Access
1. Servers		%
2. Clients		%

Which of the following Servers/Clients do you have installed/planned: (CHECK ALL THAT APPLY)

	At this location:		Entire organization:	
	I-Servers	J-Clients	K-Servers	L-Clients
01. Power PC	☐	☐	☐	☐
02. Power Mac	☐	☐	☐	☐
03. Mac Other	☐	☐	☐	☐
04. Multi Processor Servers	☐	☐	☐	☐
05. P6	☐	☐	☐	☐
06. Pentium Pro	☐	☐	☐	☐
07. Pentium	☐	☐	☐	☐
08. 486	☐	☐	☐	☐
09. 386	☐	☐	☐	☐
10. 286	☐	☐	☐	☐
11. Risc	☐	☐	☐	☐
12. Other	☐	☐	☐	☐

12 Estimated gross annual revenue of your entire company/institution: (check one only)

1. ☐ $10 billion or more
2. ☐ $1 billion to $9.9 billion
3. ☐ $500 million to $999.9 million
4. ☐ $100 million to $499.9 million
5. ☐ $50 million to $99.9 million
6. ☐ $10 million to $49.9 million
7. ☐ $5 million to $9.9 million
8. ☐ $4.9 million or less
9. ☐ None of the above

13 Estimated number of employees at this location/in entire organization:

At this location:
1. ☐ Over 10,000
2. ☐ 5,000 - 9,999
3. ☐ 2,500 - 4,999
4. ☐ 1,000 - 2,499
5. ☐ 500 - 999
6. ☐ 499 or less

Entire organization:
1. ☐ Over 10,000
2. ☐ 5,000 - 9,999
3. ☐ 2,500 - 4,999
4. ☐ 1,000 - 2,499
5. ☐ 500 - 999
6. ☐ 499 or less

14 For which areas outside of North America do you have purchase influence? (check all that apply)

1. ☐ Europe
2. ☐ Asia
3. ☐ South America
4. ☐ Australia
5. ☐ Middle East
6. ☐ None

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Local Networks

Covering: Operating systems • LAN management
Hubs • Switches • Adapters and other equipment

Briefs

Amdahl Corp. *has announced a family of* **software and hardware server bundles** *that provides customers with prepackaged database, Internet, groupware and branch office connectivity applications.*

Based on Amdahl's EnVista server line running Windows NT Server, the bundles include the following applications: Branch Office Server for centralized management of 50 remote sites; Database Server, which ships with Oracle Corp.'s Oracle7 or Microsoft Corp.'s SQL Server; Groupware Server, which is available with Lotus Notes or Microsoft Exchange Server; and I-Net Server, which includes Microsoft's Internet Information Server and provides Web access to mainframe and Unix databases. Due to be available by the end of the month, the products range in price from $77,000 for the I-Net Server to $1.5 million for the Branch Office Server.

Amdahl: (800) 223-2215.

Novell, Inc. *has announced CNE Net, a service accessible to all* **Certified Novell Engineers (CNE)** *that provides a centralized source of all certification information and support. Through this program, users can access the CNE Net Web site, beta and early release products, as well as automatic distribution of patches. These services will be free to CNEs effective Nov. 1.*

Novell: (801) 222-6000.

Dun and Bradstreet Software *has announced plans to provide hooks from its SmartStream business applications to current components of Microsoft Corp.'s* **BackOffice** *server suite by the first quarter of 1997. The SmartStream line comprises integrated financial, human resources, manufacturing and distribution applications.*

DBS: (404) 239-2000.

Cabletron offers downsized switch hub

Compaq updates Netelligent line; Xylan adds frame relay, Acacia rolls out new wares.

By Jodi Cohen
Atlanta

LAN switching is hot — especially here, where dozens of vendors will show off their new gear at the upcoming NetWorld+Interop 96 trade show.

Among these vendors will be Cabletron Systems, Inc., Compaq Computer Corp., Xylan Corp. and Acacia Networks, Inc., all of which rolled out new switches and enhancements last week.

Cabletron unveiled a little brother to its 14-slot Multi Media Access Center (MMAC)-Plus data center switching hub that provides customers with a wiring closet chassis for about half the price.

The six-slot chassis provides up to 5G bit/sec of aggregate bandwidth and supports as many as 216 Ethernet, 72 Fast Ethernet, 18 FDDI, 48 ATM or 144 token-ring switched connections. The Access chassis accepts all existing boards designed for the MMAC-Plus, as well as future products such as the planned Cell Transfer Matrix ATM backplane and Gigabit Ethernet modules, set to be announced at Interop.

NETWORLD+INTEROP'96 10th ANNIVERSARY

Previously, Cabletron customers looking to deploy high-end switching capabilities were forced to buy the top-of-the-line MMAC-Plus for about $14,024 — a hard price to swallow for the wiring closet. But Cabletron's Access switch lets customers tap into those same high-end features for a more palatable $6,690.

The scaled-down version of the MMAC-Plus will compete against similar products such as Cisco System, Inc.'s Catalyst 5000 and 3Com Corp.'s LANplex 6012.

Access, along with Cabletron's new three-port FDDI SmartSwitch module, will be available this fall. Pricing for the FDDI module is $19,995.

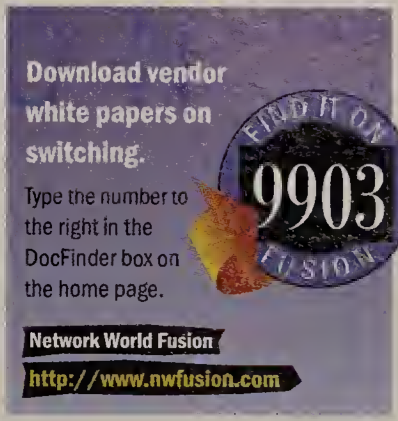
Compaq to show off Netelligent

Compaq will use Interop to show off the newest members of its Netelligent family. The Netelligent 5606 is a six-port 100M bit/sec Ethernet workgroup switch that supports IP and IPX routing, virtual LANs and Remote Monitoring capabilities. Previously, Compaq only offered an unmanaged 100Base-T switch.

Also, as expected, Compaq rolled out its Netelligent 8500 Communications Platform router for small or remote offices. The router, based on Cisco's Internetwork Operating System routing software, can be used to interconnect LANs over wide-area links such as leased lines, frame relay and X.25 services.

The router has three PCI expansion slots that allow customers to add LAN and WAN interfaces — such as Ethernet,

See Switching, *page 27*



Download vendor white papers on switching.

Type the number to the right in the DocFinder box on the home page.

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Network World Fusion
http://www.nwfusion.com

Symantec goes upscale with LAN management package

By Christine Burns
Cupertino, Calif.

Symantec Corp. has etched out its place in the enterprise network management market with new tools that give administrators central control of heterogeneous desktop and server machines.

Symantec's *Schlein says new Premier Edition works over wide-area links.*

Symantec's Norton Administrator Suite-Premier Edition takes software and hardware inventories and provides software distribution and metering, virus protection, remote control, server management and monitoring, and desktop configuration.

Each of these functions can be performed across multiple sites and network operating systems from a centralized console.

Symantec already offers a low-end desktop management suite called Norton Administrator-Essential Edition, which was rolled out in April.

The new offering varies from its predecessor in that it works over WANs, offers server management tools and can scale to manage as many as 5,000 desktop and server machines, said Ted Schlein, vice president of networking and client/server technology at Symantec.

Both suites are based on a set of common scheduling, data communications, alerting and scripting services.

"These products are our first step towards giving corporate users a simplified, integrated way to proactively manage their networks with a tightly integrated suite," Schlein said. He added

See Symantec, *page 27*

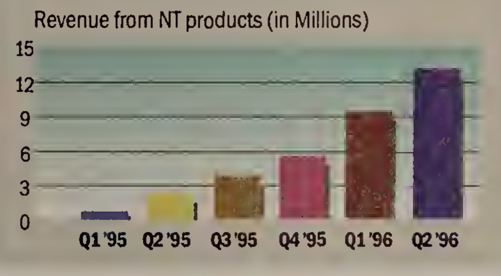
Cheyenne bolsters backup tools, improves virus scanner

By Christine Burns
Roslyn Heights, N.Y.

Cheyenne Software, Inc. this month will roll out agent software for backing up open network files and a tool that simplifies server disaster recovery in both Windows NT and NetWare nets.

NT PRODUCTS A CASH COW FOR CHEYENNE

Cheyenne officials predict that sales of the company's NT-based backup, disaster recovery and antivirus products will approach $50 million during 1996.



Cheyenne's Backup Agent for Open Files, the first product resulting from the company's July aquisition of Intelligence Quotient International, uses a patented virtual imaging technology that provides ARCserve — Cheyenne's flagship backup and restore products — with a static version of any open file. This enables ARCserve to back up files while they are in use from within any network application. Most LAN backup products either bypass open files, which renders an incomplete backup, or force users to close all files during scheduled full backup procedures. The backup process initiated by Cheyenne's new agent occurs transparently to the user.

Michael Heylin, a senior associate with Creative Strategies Research in San Francisco, said the process of backing up open files will become increasingly more important as Internet/intranet applications begin to require constant availability.

"Past solutions required some type of application downtime, which is a luxury that is not afforded to Web applications that need to be used around the clock," Heylin said.

Disaster recovery

The second product Cheyenne will introduce this month is its Disaster Recovery Option, an ARCserve add-on that cuts down the time involved in rebuilding configuration data on a server after it crashes.

"Right now, administrators can literally take days to get a server properly reconfigured to the point where they can run a

See Cheyenne, *page 27*

WIRED WINDOWS

Frankenberg was no Frankenstein

There's certainly a lot to say about Novell, Inc. and CEO Robert Frankenberg parting company.

Most pundits have focused on the company's sale of WordPerfect, falling profits and new product delays as the major reasons.

A few have even mentioned that Novell was late to embrace Internet technologies. But knowledgeable Novell customers know this last reason is pure hogwash.

Novell's been involved in Internet technologies since its purchase of Excelan back in the '80s. Before Microsoft Corp. started giving away its IP stack and a few applications with Windows 95, Novell's LAN Workplace was the dominant IP stack and Internet suite on the PC desktop.

Dave Kearns

And when it comes to browsers and intranets, Novell's Corsair and Ferret initiatives started two years ago, long before there was a Netscape Communications Corp. or Bill Gates could spell Internet.

True, Novell's early initiatives floundered and will probably never see the light of day in their initial design, but the company was there before any other major PC software firm.

Separately, Frankenberg almost single-handedly ended Novell's holy war against Microsoft, begun in the waning days of Ray Noorda's reign. Through personal meetings with Gates and encouragement of low-level cooperation, Frankenberg saved Novell from almost certain death at the hands of the monster from Redmond. Yes, there's still competition between the two, but the level of the verbal war has been raised from the personality level to a legitimate battle about network operating systems.

Possibly as a result of settling the feud, and certainly as a result of cooler thinking, certain products fell by the wayside. DR-DOS was simply abandoned, while WordPerfect had to go. Although a lot of us second-guessed Novell's handling of the sale — first announcing it would be gone by a certain date, then looking for a buyer — it appears the Corel Corp. deal was about as good as could be expected.

Remember, too, that for his first year at Novell's helm, Frankenberg was supposedly trying to sell off the entire company with IBM and AT&T being alternatively painted as the potential buyer. While it still could happen, it appears Novell is now ready for the long haul. NetWare still is the largest selling NOS, with Novell owning more than 60% of the LAN business.

Another laughable knock against Frankenberg was his less-than-charismatic speaking. Sure, his voice still breaks occasionally, but in an industry dominated by dweebs, who are the charismatic speakers?

Novell has come through a two-year transition from the Noorda years to some unknown future. Frankenberg was the ideal guy to handle that transition while maintaining market share.

Kearns, a former network administrator, is a freelance writer and consultant in Austin, Texas. E-mail him at dkearns@msn.com.

Tip of the week

With just about everyone taking Microsoft Corp. to task for its lack of a global directory system in Windows NT 4.0, you might want to check out a new product from Master Design & Development, Inc. The company's Trusted Enterprise Manager offering has user administration functions comparable to those found in network operating systems such as NetWare and VINES. Pricing starts at $295 for a 10-user system. An evaluation version is available via the company's Web site at http://www.www.evinet.com/mdd.

SIEMENS
ROLM Communications

If we built a $36 million telecommunications network in the Russian

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Switching

Continued from page 25

token ring, FDDI and ISDN — as the network grows. Compaq also rolled out new software designed to manage the router.

Pricing for the router starts at $2,767, and the 100Base-T switch is priced at $5,567. The Netelligent 5606 and the Netelligent 8500 Communications Platform router will be available next month.

Xylan adds frame relay support

In related news, Xylan announced frame relay support for its OmniSwitch and PizzaSwitch LAN devices. The new two-, four- and eight-port serial interface modules allow as many as 64 frame relay ports in an OmniSwitch chassis and eight frame relay interfaces in the smaller PizzaSwitch device.

The frame relay module — Xylan's first WAN interface for its switching LAN gear — allows customers to connect regional offices to a corporate headquarters. In addition, frame relay allows users to extend virtual LANs across the entire enterprise, according to Douglas Hill, vice president of corporate communications.

The two-port wide-area serial module is priced at $5,500, the four-port model is priced at $7,000 and the eight-port version is priced at $9,500. All products will be available by December.

And finally. . . Acacia

Not to be left out, Acacia rolled out its new 12-port 10M/100M bit/sec Ethernet switch.

The NovaSwitch 12000LX, which can be stacked up to four units high, has a switching capacity of 1.9G bit/sec. NovaSwitch is priced at $9,995 and will be available in December.

Acacia also rolled out NovaWeb Manager, which allows customers to manage the switch from a Web browser. It is priced at $295 and is available now.

✆Cabletron: (603) 332-9400; Compaq: (713) 514-0484; Xylan: (818) 880-3500; Acacia: (508) 458-7200.

Symantec

Continued from page 25

that Symantec would ship revisions of both suites before year-end.

David London, a network administrator in a large New York law firm who currently uses several of Symantec's stand-alone desktop management tools, said the new integrated tools package will save time and money.

"This product will drastically cut down the time I spend running from machine to machine taking care of management tasks," he said.

Premier Edition is available now and ranges in price from $57 per node for 1,000 licenses to $42 per node for 5,000 licenses.

✆Symantec: (800) 441-7234.

Cheyenne

Continued from page 25

product like ARCserve to restore all of their network files," said Wayne Lam, vice president and general manager for Cheyenne's NetWare division. He added that his company's product can reduce that time to hours.

An administrator uses a Disaster Recovery utility to create boot disks that contain all system files critical to the reboot process, such as device drivers and server partition information. When a server crashes, ARCserve uses system information contained on the boot disks to create and format partitions and restore the network operating system. ARCserve then launches a full restore of all backed up data.

Separately, Cheyenne will deliver InocuLAN 4.0 for NT, which includes a tool that scans for viruses on NT and NetWare servers.

It also features the ability to automatically download and distribute virus updates to all machines, and includes utilities that trace viruses to the point of entry on the network and log out infected users.

Backup Agent for Open Files is available immediately for $695 per server. Both the Disaster Recovery Option for ARCserve 6.0 and InocuLAN 4.0 for NT will ship at the end of the month and cost $495 per server.

✆Cheyenne: (800) 243-9462.

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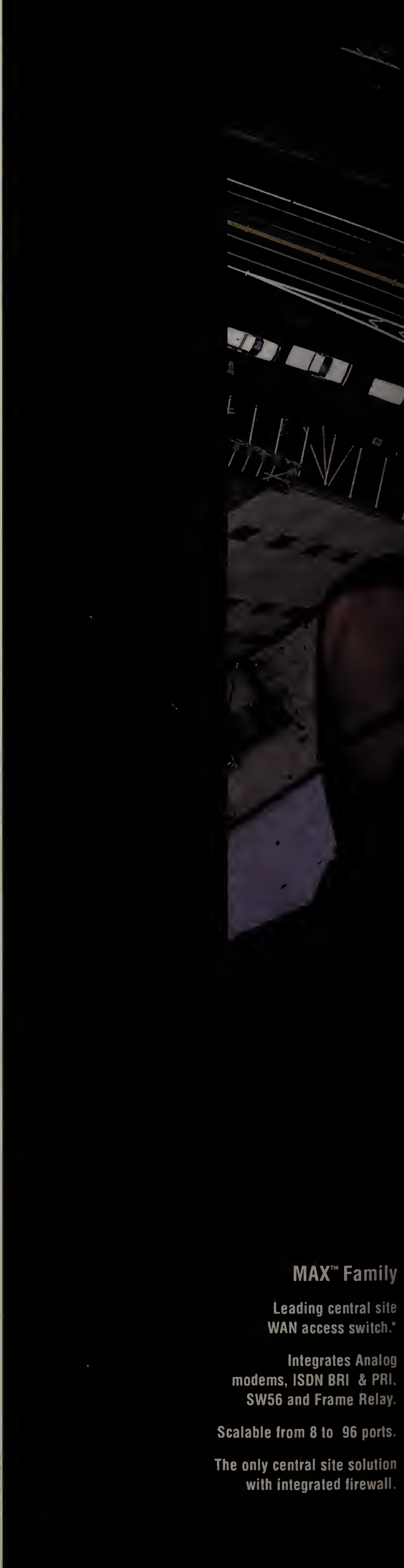

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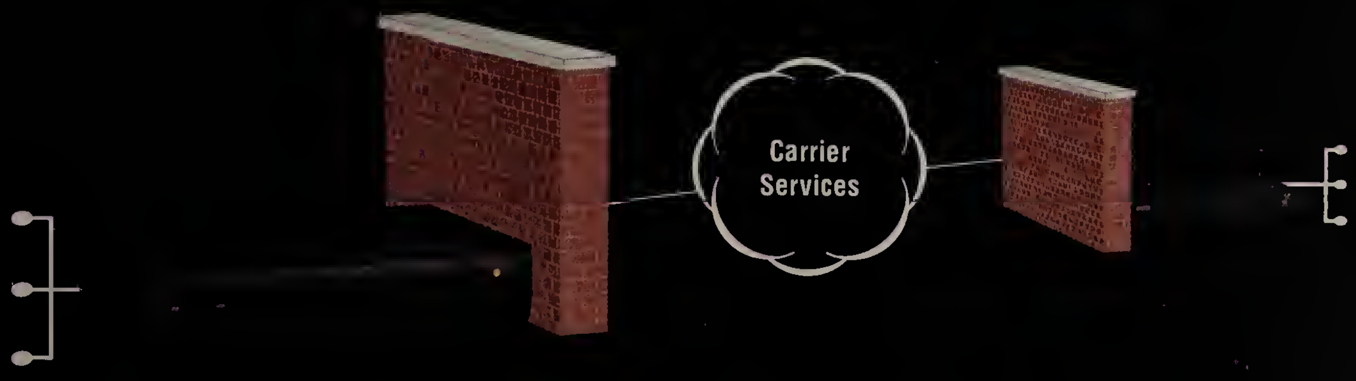

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Microsoft's BackOffice comes to the forefront

What's the big attraction? NT Server integration, common management across applications and a juicy price break.

By Christine Burns

Why go through all the hassle of managing a mixed server applications environment when you can get all the workflow, database, Web and systems administration services you need in one box from one vendor? That's exactly the point Microsoft Corp. has been trying to make with its BackOffice server suite.

Microsoft's *Ballmer contends that the dependency of the BackOffice components on Windows NT server can only strengthen the suite's position in the market.*

So far, the point has been well taken by customers. Wall Street analysts estimate that between the time Microsoft rolled out BackOffice 1.5 last October and the end of its fiscal year in June, the company racked up $1 billion in server suite sales. Those same analysts predict BackOffice revenues will balloon to $1.8 billion in this fiscal year.

Customers said the reasoning behind their decision to run with this Microsoft-only server solution is threefold: pricing discounts; integration with Windows NT Server services, such as security; and integration between the individual applications, which eases both end-user access and overall systems management.

"It's a given that NT Server is an outstanding platform for running applications," said Richard Warren, vice president of information systems at Judd's, Inc., a magazine publishing firm based in Washington, D.C. But software discounts and improved management across applications sealed the deal on his decision to install 10 copies of the BackOffice suite throughout four corporate sites.

It's about money

BackOffice 2.0 currently is based on Windows NT 3.51 and comprises a series of applications. These include SQL Server 6.5 for database services; Internet Information Server (IIS) 1.0 for Web access; SNA Server 2.11 for ties to legacy systems; Exchange Server 4.0 for workflow and E-mail capabilities; and Systems Management Server (SMS) 1.1 for software distribution, inventory and some remote control diagnostics.

BackOffice exists both as a single product and as a family of individual applications.

In its solitary box iteration, BackOffice includes all the necessary client and server software to run the suite of applications, as well as single server-side licenses for Windows NT Server and each of the five applications. It sells for $2,199 — about 40% less than it costs to buy the applications individually.

This version of BackOffice, which is targeted for sale into departments and branch offices, ships with an automated server installation program and must be installed on a single server. Microsoft recommends a Pentium-based machine with a minimum of 32M bytes of memory and 400M bytes of disk space to accommodate all of the applications.

DESIGNED FOR BACKOFFICE

Microsoft compiled this list of requirements for any application vendor that wants to certify its product to work with all of the BackOffice components. To date, 100 applications have received Microsoft's seal of approval and over 100 more are working toward that end.

Server requirements:

- Must run as a Windows NT Server service
- Have network independence through support for both IPX/SPX and TCP/IP
- Support Windows NT unified logon
- Be installable using Systems Management Server (SMS)
- Support for ISAPI if application is Internet-related

Client requirements:

- Support for industry standards in each client category (ODBC for SQL Server client applications, MAPI for Exchange client applications, etc.)
- Be installable using SMS
- Must have at least a 16-bit Windows-based client (Win32 client preferred)

Further details can be found at www.microsoft.com/BackOffice/designed/infodsgn.htm.

Larger customers requiring multiple copies of certain applications can purchase the components separately and still buy the BackOffice client access licenses, which give end users unlimited access to all of the applications.

"This pricing model gives an administrator a great deal of flexibility in terms of being able to add more applications as the company's needs expand without having to spend more money on the client side," said Murari Nuryan, Microsoft's BackOffice product manager. He added that there is approximately a 30% reduction in client licensing fees when users opt for the BackOffice client over buying the individual applications client licenses.

Alex Gaul, a systems consultant at George Westin, Inc., a large holding company based in Toronto, said his firm has been running most of the BackOffice components since before they were offered as a suite. He said that while there was no financial benefit to buying the BackOffice server, purchasing the BackOffice client licenses amounted in significant savings for his company.

Integration: A selling point

Nuryan said integration of the BackOffice suite occurs on several levels. The first is integration between the applications and the Windows NT operating system. Nuryan said this optimizes performance, noting that recent independent studies show SQL Server is the fastest database server and ISS is the fastest Web server available for NT. Integration with NT also provides a common security model across applications, giving end users a single logon.

Neil MacDonald, a senior research analyst with Stamford, Conn.-based Gartner Group, Inc., said this level of integration could be greatly improved through a common directory across applications.

The Exchange directory is a separate and distinct directory from the NT domain directory. They share a common user ID, but the rest of the user information is stored in two separate files with two separate replication schemes, he said. MacDonald noted this situation should be remedied when Microsoft ships a hierarchical directory service with the next major revision of NT next year.

The second area of integration occurs between applications, said Nuryan, as each application uses services provided by the others to make overall administration easier. As an example, Nuryan explained that if a user is running a data warehousing application on SQL Server and a certain parameter of the database exceeds a predetermined limit, a network manager can be notified automatically via Exchange. Similarly, IIS has been upgraded to let users dynamically update Web pages with information from a SQL Server database.

Microsoft attempts to accomplish integration with heterogenous environments by providing ties from each BackOffice component to its counterparts offered by other vendors.

"BackOffice can play in either a NetWare or Unix environment because NT Server has tools that connect to those other operating systems," Nuryan said. "The same is true with SQL Server, which can replicate data to other ODBC-compliant databases, and with Exchange, which out of the box can work with other SMTP and X.400 messaging engines."

BackOffice to the future

Nuryan said it is Microsoft's goal to increase the level of application interoperability with each new version of BackOffice. Microsoft is scheduled to ship a new suite sometime before the end of the year that will include updated releases of the individual components, such as NT Server 4.0, IIS 2.0, SMS 1.2, SNA Server 3.0 and Exchange Server 4.1.

Additionally, he said Microsoft is considering the inclusion of other server applications currently in beta, such as its content indexing server, proxy server and media server.

Since all existing and future components of BackOffice run on NT Server only, the success of the suite is dependent upon the functionality and the proliferation of that server platform.

During a recent presentation to more than 500 NT customers in San Francisco, one senior Microsoft executive said NT Server's popularity demonstrated in the last year wildly exceeded company expectations.

BACKOFFICE PRICE POINTS

Offering	Price
BackOffice Server 2.0 (includes all client and server software, plus a single license for Windows NT Server 3.51, Internet Information Server 1.0, SNA Server 2.11, SQL Server 6.5, Exchange Server 4.0 and Systems Management Server 1.1)	$2,199
BackOffice Server 1.5 upgrade	$769
BackOffice client access license	$269 (1 user) $1,309 (5 users) $4,179 (20 users)

"It's been stunning. Last year, sales doubled sales for the previous year, and we are well on course for doubling NT Server sales again this year," said Steve Ballmer, senior vice president of sales and marketing.

Ballmer said future NT Server growth can only contribute to the success of BackOffice as an integrated suite. As Microsoft invests in adding functionality to NT Server — such as beefed up directory services and stronger Internet/intranet ties — the applications running on top of NT server will benefit, he said.

While Microsoft is confident about the future of both Windows NT Server and BackOffice, industry observers are hesitant to hedge all bets on a sole vendor enterprise suite of applications.

"Running solely on NT may turn out to be one of the things that stands against the continued success of BackOffice," according to Rob Enderle, an analyst with Giga Information Group in Santa Clara, Calif. "Companies really want a set of tools that work across a variety of platforms and they want some choice with regard to the platforms that they base their business critical applications on." ■

Briefs

■ *Several companies announced new products at the* **Desktop Videoconferencing Conference and Exposition** *last week in Boston.*

VCON, Inc. for example, rolled out the Armada Escort 50, a desktop videoconferencing product that is H.320-compatible and lets users communicate over TCP/IP or ISDN networks. Available now, the Armada Escort 50 costs $1,195. And **RADVision** *announced it has started shipping the H.323 Software Stack, which lets videoconferencing systems communicate over LANs, intranets and the 'Net using H.323. The product is available to OEM partners now for Windows and Unix. Pricing was not available at press time.*

VCON: (214) 735-9001; RADVision: (201) 529-4300.

■ **Oracle Corp.** *last week unveiled intranet application features for Oracle Power Objects, its visual client/server tool set for Basic developers. The Power Objects Plug-In lets* **Web browsers** *download any Power Objects application, including ActiveX controls, from a server and run it. The plug-in will ship with Power Objects 2.0 in November. Pricing will remain the same.*

Oracle: (415) 506-7000.

■ *Three* **key additions** *have been released for Sybase, Inc.'s* **Replication Server** *product family, which copies data among networked Sybase and other databases.*

The Replication Agent for Lotus Notes creates a two-way link to copy data between Notes groupware systems and corporate databases. Pricing starts at $1,600.

The Replication Toolkit for MVS lets mainframe programmers build links between MVS applications and the Replication Server. Toolkit pricing starts at $35,000. Thirdly, new Replication Agents for IMS and VSAM will enter beta testing this month and ship in December. Pricing has not been set.

Sybase: (510) 922-3500.

Advanced 'Net mail on the way

Companies target early 1997 to go beyond POP3 with full-blown IMAP4 support.

By Barb Cole

A spate of messaging products that exploits Internet Message Access Protocol 4 (IMAP4) is expected to roll out early next year, bringing more advanced messaging features to Internet mail.

Several vendors are expected to show off products that support IMAP4 at MailConnect 2, an interoperability demo to be hosted by the Internet Mail Consortium (IMC) early next year.

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- **A catalog of existing IMAP software**
- **Downloadable IMAP software**

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http://www.nwfusion.com

"By the time we hold that meeting, users will find that they have access to a robust set of [Internet messaging] products," said David Crocker, co-founder and co-director of IMC.

Several vendors — including Lotus Development Corp., Microsoft Corp., NetManage, Inc., Software.com, Inc., and Sunsoft, Inc. — have already talked up their intentions to add IMAP4 support to their messaging servers.

Crocker said vendors at the demo will likely test one of the most advanced features of IMAP4 — the ability for the mail client to disconnect from the network and then synchronize with the mail server when reconnected.

Post Office Protocol 3 (POP3), the current Internet messaging standard implemented in most mail systems, lets end users work remotely but requires that they download mail to a PC with a specific IP address, such as a preconfigured laptop. IMAP4 will enable end users to download mail from any PC equipped with IMAP4-compliant software.

"It's a big hassle to access a POP3 mailbox over dial-up lines," said David Ferris, principal at Ferris Research, a consultancy based in San Francisco.

Companies that have implemented Internet mail are anxiously awaiting products that support IMAP4.

"IMAP4 support is critical to us," said a director of software engineering at an overnight express delivery company in Northern California that has an all-Internet mail network. IMAP4 support will mean the company's highly distributed workforce will have more flexibility when it comes to retrieving mail from the road.

Market demand for IMAP-based mail products is strong so users can expect an ever-growing choice of products that support the spec, according to Ferris.

The IMC is hosting MailConnect 2 so vendors can get the kinks out of their mail offerings as they add Internet hooks. An earlier IMC event, MailConnect 1, was held in San Jose, Calif., last month. Fourteen companies tested some low-level IMAP4 capabilities as well as their Multipurpose Internet Mail Extensions for sending multimedia content via the Internet.

MailConnect 1 participants

- CommTouch
- Esys
- Hummingbird
- Innosoft International
- Isocor
- Lotus
- MetaInfo
- Microsoft
- NetManage
- Qualcomm
- Software.com
- SunSoft
- Turnpike
- Worldtalk

At the event, IMAP products were primarily tested for online use, with client and server connected full time and the server holding all the mail.

"While some minor [interoperability] issues were raised [at MailConnect 1], there really weren't any major problems," Crocker said.

"Both the [IMAP] spec and the [mail] software are in pretty good shape," he said. ■

Web applications

Simware fires off Salvo to marry the Web with legacy systems

By John Cox
Ottawa

Simware, Inc. this week will release Salvo Vista, a set of tools for speeding up the creation of Web applications that can interact intelligently with legacy data and applications.

Simware, based here, also announced a new version of Salvo Connect, which is a Windows NT-based program that lets Web browsers access applications on mainframe and Applications System/400 computers. Version 3.0 adds the Open Database Connectivity (ODBC) interface and drivers for IBM, Informix Software, Inc., Oracle Corp. and Sybase, Inc. databases.

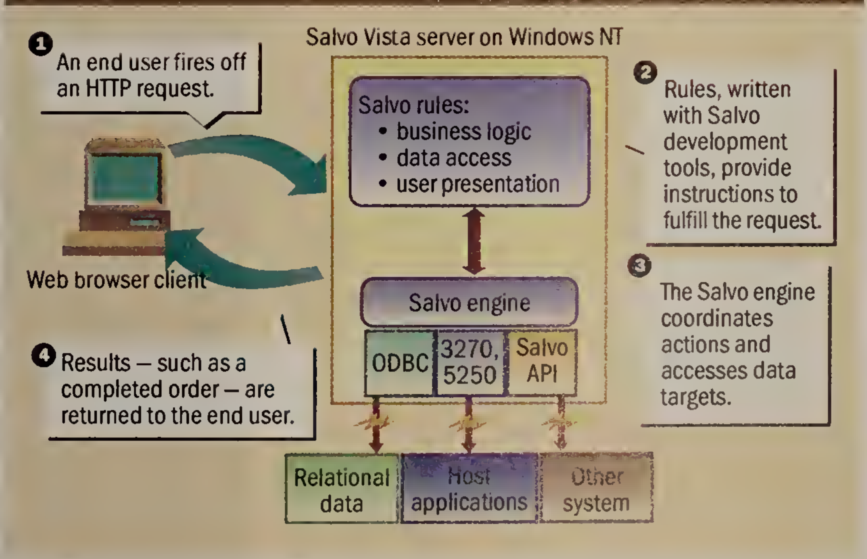
Key parts of Salvo Connect are included in Salvo Vista to create the back-end links to legacy systems and data. These include a new API to access custom applications.

Salvo Vista also includes other features that differentiate it from the many other Web tools that simply present legacy application screens in a Web browser as HTML pages or send a request to a relational database.

For example, Salvo Vista boasts a scripting language and graphical tools for defining a set of server-based rules, which Simware calls Information Objects, and a server program called the Salvo engine, which uses these rules to fulfill a browser request.

The rules are instructions to Salvo Vista on where and how to find data, what to do with it when found, and how to present it to the user.

How Salvo Vista links legacy systems with the Web


❶ An end user fires off an HTTP request.
Web browser client
Salvo Vista server on Windows NT
Salvo rules:
• business logic
• data access
• user presentation
❷ Rules, written with Salvo development tools, provide instructions to fulfill the request.
Salvo engine
ODBC
3270, 5250
Salvo API
❸ The Salvo engine coordinates actions and accesses data targets.
❹ Results – such as a completed order – are returned to the end user.
Relational data
Host applications
Other system

It is the flexibility of this approach that is a key Salvo Vista benefit, according to Tim Sloane, an analyst for Aberdeen Group, Inc.,in Boston.

In a just-published report, Sloane wrote Salvo Vista "provides IS [groups with] unparalleled flexibility to transform enterprise data into critical new corporate information."

Developers write the rules initially in a REXX scripting language, but Salvo Vista will soon support Microsoft Visual Basic and Java.

Salvo Vista can be called directly from a Web browser. But Salvo Vista does support the Netscape API, so it can work with Netscape's Web server products for greater security.

Salvo Connect 3.0, with ODBC support, will be ready Oct. 15. Pricing starts at $3,950 for 10 concurrent users.

Salvo Vista will be demonstrated next week at NetWorld+Interop 96 in Atlanta. It will be available Oct. 15. Pricing starts at $7,250 for 10 concurrent users.

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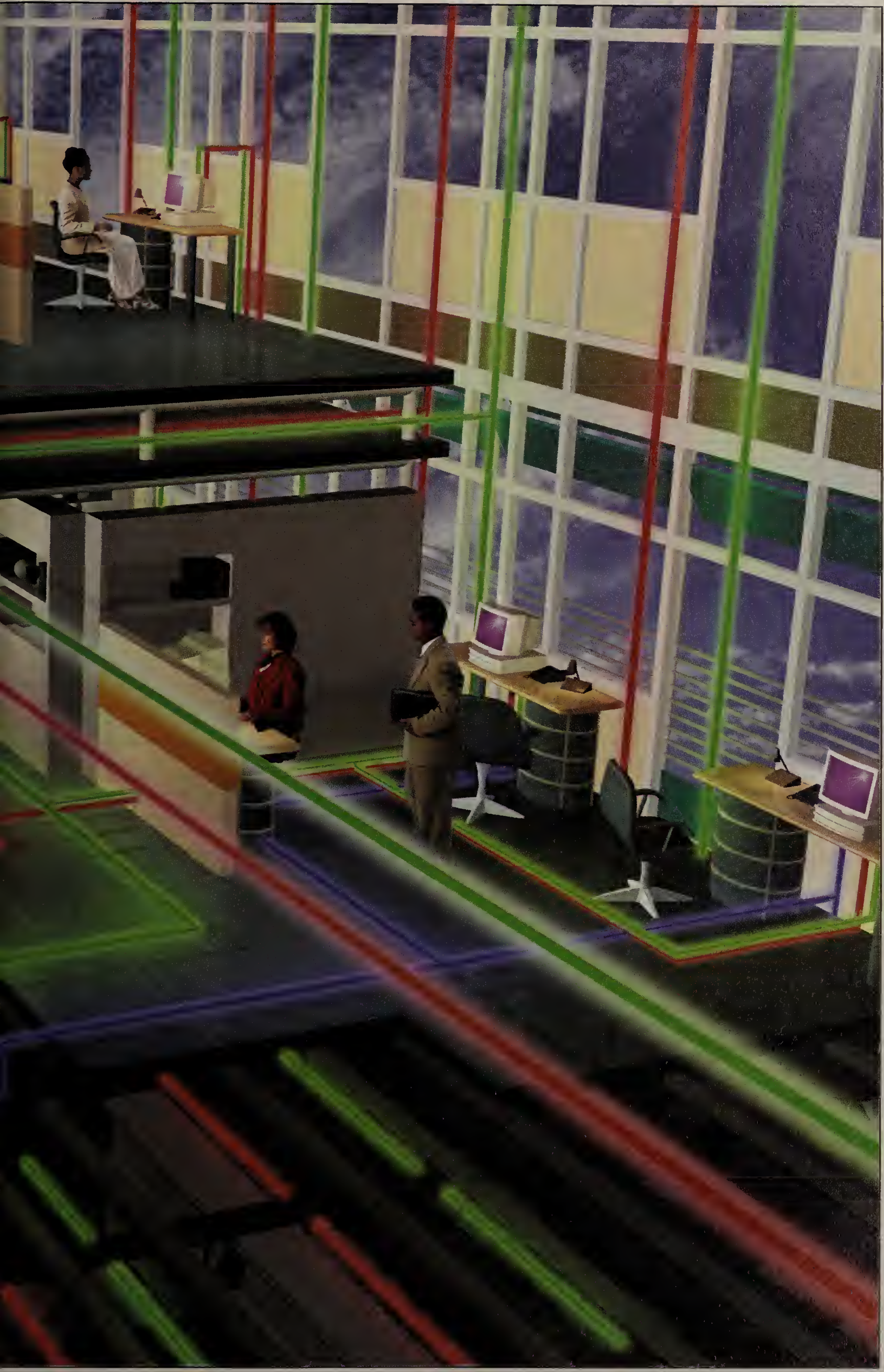

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SHARED LOGIC

Marc Myers

Oracle databases and war games

It's an interesting time that we live in. As I sit at my laptop computer pondering the latest high-tech extensions to Oracle Corp.'s Oracle7 server, American B-52 bombers are closing in on southern Iraq, where they will drop several thousand pounds of explosives onto military targets. These events are only related by their proximity in time and perhaps by their coexistence in this paragraph.

But in fact, there may be more of a relationship than first meets the eye. Release 7.3 of the Oracle7 database server includes the Spatial Data Option. Its purpose is to make spatially oriented data easy and efficient to manage and retrieve from very large databases.

For example, suppose the U.S. needed to extract, from a database of hundreds — or even thousands — of gigabytes of geographical data points, the exact locations of a few selected targets. The fastest way to do so that I've found is with the Spatial Data Option.

This is because the programmers over at Larry Ellison's Redwood Shores, Calif., digs have developed an admittedly simplistic, but altogether ingenious, technology that allows the database to automatically reorganize and reoptimize its physical data ordering based on the composition of a multidimensional numeric key known as Helical Hyperspatial Code (HHCODE).

Although I am not privy to the detailed design of HHCODE, it appears to be an algorithm for creating a single key that is based on the intersection of two or more numeric keys, such as longitude and latitude. It's what a mathematician might call the linearization of the data.

The end result is that the more numerically proximal the data, the closer together it is stored in the database.

Once HHCODE stores the data, the Spatial Data Option takes care of the automatic subdivision of the data into multiple partitions. As Oracle describes the process in its literature, "When a table containing data for a specific region becomes too dense to maintain fast access times, it automatically subdivides into multiple partitions based on its spatial organization."

The designer is simply responsible for telling the Oracle7 database what the maximum partition sizes are so that it will know when to subdivide.

The power of this type of data organization should not be underestimated. The Spatial Data Option includes its own SQL language extensions, known as SD*SQL, which allow special queries to be constructed to extract data in a window around a given point. For example, data could quickly be extracted by "range search," which engages a widening rectangular search around a given point. Or it could be retrieved in a "proximity search," which involves a widening circular search around a given point.

The proximity search would be the ideal way to retrieve impact, or shockwave, reports relative to the specific central point.

This brings me to my point. It appears that this kind of technology should be classified and restricted. But as technology speeds up, it has truly become impossible to gauge the long-term impact of our new innovations and to examine their potential for benefit and harm.

But one thing is clear: Software engineering is no longer a university game; it is serious business and the responsibility for its safe and intelligent distribution must be upheld by the vendors that are its creators.

Myers is CEO of Client/Server Connection, Ltd., a New York-based software development company. He can be reached via the Internet at mmyers@cscl.com.

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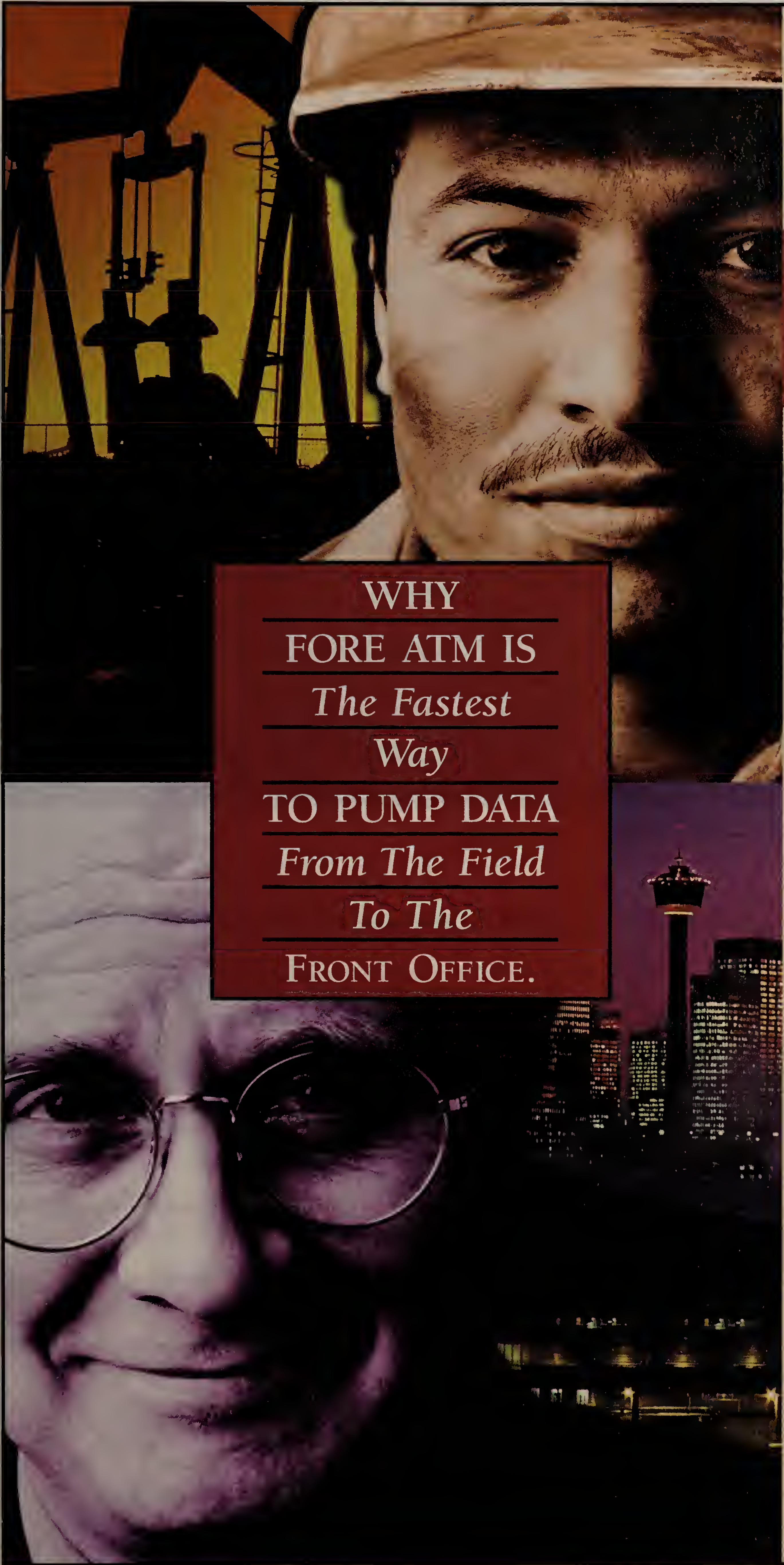

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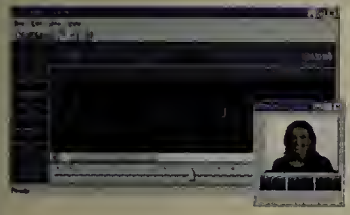
Briefs

■ *Start-up* **VXtreme Corp.** *last week announced the Web Theatre product family for creating stored multimedia presentations over an IP network. The Web Theatre Production software*



lets organizations create **video-enabled Web pages** *by capturing and compressing video files from sources such as VCRs, cameras and Video for Windows files. The multimedia presentation can then be read with a browser plug-in called the Web Theatre Client from a stored file on the Web Theatre Server. The package is priced at $1,995.*

VXtreme: (415) 614-0700.

■ *Database vendor* **Microrim, Inc.** *last week began shipping an $89 Web tool kit called Submit This, containing ready-made* **HTML forms** *for business or personal use and prewritten Common Gateway Interface scripts.*

Microrim: (206) 649-9500.

■ *The Durham, N.C.-based start-up* **Site/technologies/inc.** *last week introduced SiteSweeper 1.0, a $299* **Web site management** *tool that creates customized reports in HTML format. SiteSweeper, which runs on Windows 95 or NT, can detect broken links or identify incorrect image references.*

Site/technologies/inc.: (919) 416-3113.

■ *Internet service provider* **Digix, Inc.** *last week said it will offer* **Web hosting** *services using Microsoft Corp.'s NT 4.0 operating system software and the Microsoft Internet Information Server 2.0 server software. The services start at $1,500 per month.*

Digix: (301) 847-5000.

■ **American Express Corp.** *has selected* **GTE Corp.** *to operate its certificate management service for the* **digital certificates,** *dubbed NetIDs, which American Express will distribute to consumers and merchants.*

EDI transfers

Chase Manhattan parks VAN, drives up to Internet

By Ellen Messmer
New York

The Chase Manhattan Bank, N.A. is starting a pilot program to handle EDI-based corporate payment requests over the Internet instead of through the more closed value-added networks, the company recently announced.

"We need to see how this issue about exporting cryptography gets resolved."

Tom Fitzgerald, new business development manager for global payment and treasury services at Chase Manhattan Bank

Petroleum refiner Diamond Shamrock, Inc. will be the first Chase banking customer to send financial electronic data interchange (FEDI) payment instructions over the 'Net. It will use the system to pay vendors through bank account transfers. Both trading partners said switching from value-added networks (VAN) to the Internet will save money and provide wider global connections.

"VANs don't cover the whole world, and we think there's got to be a better way than trying to string them all together," said Tom Fitzgerald, new business development manager for global payment and treasury services at Chase. "The alternative is to use mail-based IP networks."

Robert Becker, vice president and treasurer at Diamond Shamrock, said his company has a growing number of EDI trading partners, and conducting business on the 'Net is "viable, cost-effective and efficient."

The trial project is designed to determine if critical EDI business data can safely make it

See Chase, *page 42*

Best pitches secure Web-based EC

By Joanie Wexler

A midsize Internet service provider in Northern California has become the first to offer a secure, Web-based transaction processing service.

Best Internet Communications last week announced its Business Commerce Server, a service that packages standard electronic commerce encryption technology, the CyberCash secure Internet payment service and Web hosting.

Business Commerce Server is already running in several early sites, including those of Burpee Seed Co., a large nursery and feed supplier based in Pittsburgh; the Oakland Athletics; and CoolStuff, Inc.

Best's credit card transaction processing component is based on Netscape Communications Corp.'s Commerce Server, which uses Secure Sockets Layer. SSL encrypts information en route from a user's browser to the merchant's Web site and the CyberCash service. CyberCash links incoming credit card information to about 90% of U.S. banks for verification and approval. The whole process takes 20 seconds.

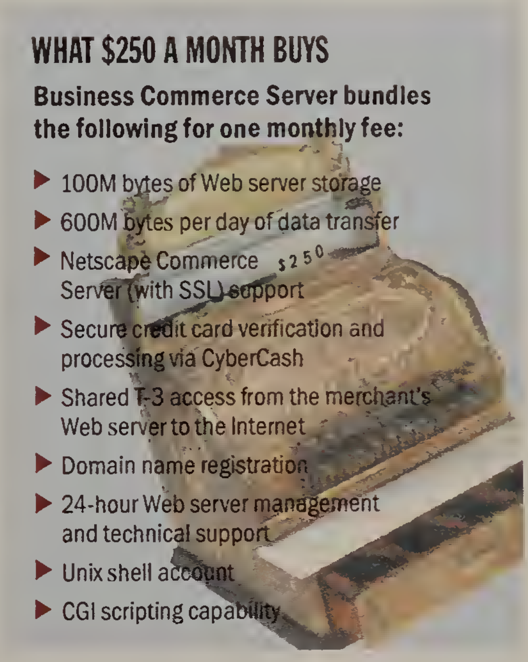
Best yet to come?

"Best is the first to put these pieces together into a secured electronic commerce service, but this will soon be standard fare [from ISPs]," said Doug Rutherford, an analyst with Zona Research, Inc. in Redwood City, Calif., which follows the 'Net market.

For example, BBN Planet plans to announce later this month a similar end-to-end service, though bundling hosting with the transaction processing will be optional, according to company officials. IBM Global Network is said to be readying such a service, and AT&T said it has a version in development.

Currently, AT&T can process non-Internet transactions for merchants, but must accept orders by voice or fax. BBN is already accepting orders electronically and securing credit card information for its hosting customers such as the Massachusetts Registry of Motor Vehicles (*NW,* June 17, page 1), but now stops short of providing the actual processing.

Having a ready-to-wear electronic commerce service available "helps information systems personnel service their users more quickly," said Christina Kish, Best's director of marketing. Companies that have typically sold products by catalog and processed phone orders are now starting to quickly seek ways to allow consumers surfing their sites to complete a transaction on the spot, she said.



WHAT $250 A MONTH BUYS

Business Commerce Server bundles the following for one monthly fee:

- 100M bytes of Web server storage
- 600M bytes per day of data transfer
- Netscape Commerce Server (with SSL) support
- Secure credit card verification and processing via CyberCash
- Shared T-3 access from the merchant's Web server to the Internet
- Domain name registration
- 24-hour Web server management and technical support
- Unix shell account
- CGI scripting capability

The service, which includes several hosting and management components (see graphic) is available immediately for $250 a month, after a $500 start-up fee.

The cost "is nothing," said Evan Gilbert, marketing director at Wildcat Canyon Software, a maker of music software in Berkeley, Calif., and an early Business Commerce Server merchant.

It would cost the small firm about $1,000 a month to handle the function on its own, largely to lease a dedicated line to the Web server, he said.

Wildcat hopes to soon be singing a happy tune. "Electronic commerce still accounts for only 5% to 10% of our sales," Gilbert said. "But we expect that to grow quickly."

The reason: The company is set to launch WebTracks, software that allows Web site owners to add music to their home pages.

"Web products are perfect for Web-based electronic commerce," Gilbert said. ■

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Electric power companies turn on X.509 security certificates

By Ellen Messmer
Austin, Texas

This fall, when the electric power companies start taking transmission orders directly over the World-Wide Web, they will count on security software from TradeWave Corp. to prevent hackers from creating chaos on the nation's power grid.

Only energy customers using X.509 public-key certificates and TradeWave Corp.'s browser-based security software will be able to access the utility industry's seven Web servers, the Joint Transmission Services Information Network (JTSIN).

"The local utility will distribute the X.509 certificates to the customer, said Frank Royster, director of information technology for Southwest Power Pool, one of the seven power pools investing in JTSIN to satisfy a federal regulatory mandate to publicly post rate data through unspecified open systems.

But the trick is not to make it so open anyone can get in. An X.509 certificate, which binds an

See TradeWave, *page 42*

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PACIFIC BELL
NETWORK

How will you use it?

TradeWave

Continued from page 39

individual's identity to an encryption key, presents a stronger alternative to simple reusable Web page passwords that hackers can easily sniff on the 'Net.

The seven utility groups picked a team of three vendors to get them up and going on the Web: TradeWave, Cegelec ESCA and BSG Alliance/IT, Inc.

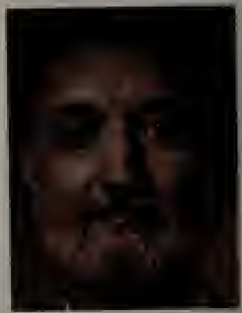
Cegelec ESCA, with experience in electric power utility software, and BSG are developing the Web content, the Common Gateway Interface scripts to the back-end databases and the Web reservation forms the power utility customers will use.

Kennen Schmitz, BSG's director of business development, said JTSIN will be set up so that each utility can send updates of their rates either manually or automatically to the appropriate JTSIN Web server.

Each server will then send transmission reservation requests it receives as encrypted E-mail to utilities. The utilities will then send reservation acknowledgments by E-mail to the buyer. At present, transmission reservations — a $25 billion business annually — are made via phone or fax.

TradeWave is handling the X.509 key management and storing the escrowed encryption keys. IBM, with considerably more nationwide presence than start-up TradeWave, is assisting as the project's facilities management subcontractor. According to TradeWave Chief Technical Officer Alex Cavalli, a browser will have to use a unique X.509 public-key certificate and TradeWave's special encryption software to gain access to the Web server via TradeWave's access control server.

The TradeWave access control server has a database that lets the JTSIN administrator set access privileges based on what is known as the distinguished name standard — a way to generate a unique name in the X.509 certificate based on an individual's name plus other information.



TradeWave's *Cavalli pushes standards.*

"It's a onetime login procedure," Cavalli said. Onetime sign-on will simplify matters for JTSIN users, because some will only be authorized to read Web pages for information and others will be able to buy.

According to Cavalli, another benefit of the TradeWave approach is that the utilities and their customers will not have to standardize on any particular browser and server, many of which use incompatible security procedures.

TradeWave's JTSIN encryption software is based on two IETF standards, The Simple Public-Key Mechanism and Generic Security Services. The complete client/server security package is called TradeVPI (for Virtual Private Internet), and it ships this week.

Avoiding pitfalls

The utilities hope that JTSIN, based on Web standards, will avoid the pitfalls the gas industry suffered a few years ago when it set up online systems in response to regulatory demands for more open systems.

At that time, gas companies set up separate bulletin boards, each requiring different client software and passwords, creating a headache for the gas industry's buyers. ■

Chase

Continued from page 39

across the hacker-infested 'Net. Chase and Diamond Shamrock will use Premenos, Inc.'s Templar 2.0 product for Secure Multi-purpose Internet Mail Extensions (S/MIME).

Templar S/MIME servers can send and receive encrypted mail with EDI attachments, and keep a log of outgoing mail and delivery acknowledgments.

Chase and Diamond Shamrock have considerable interest in using the Internet for sending payment requests, purchase orders, shipping notices and invoices to their trading partners internationally.

But with encryption viewed as a necessity, their plans will be largely limited to domestic use as long as the U.S. prohibits the export of unbreakable encryption. ■

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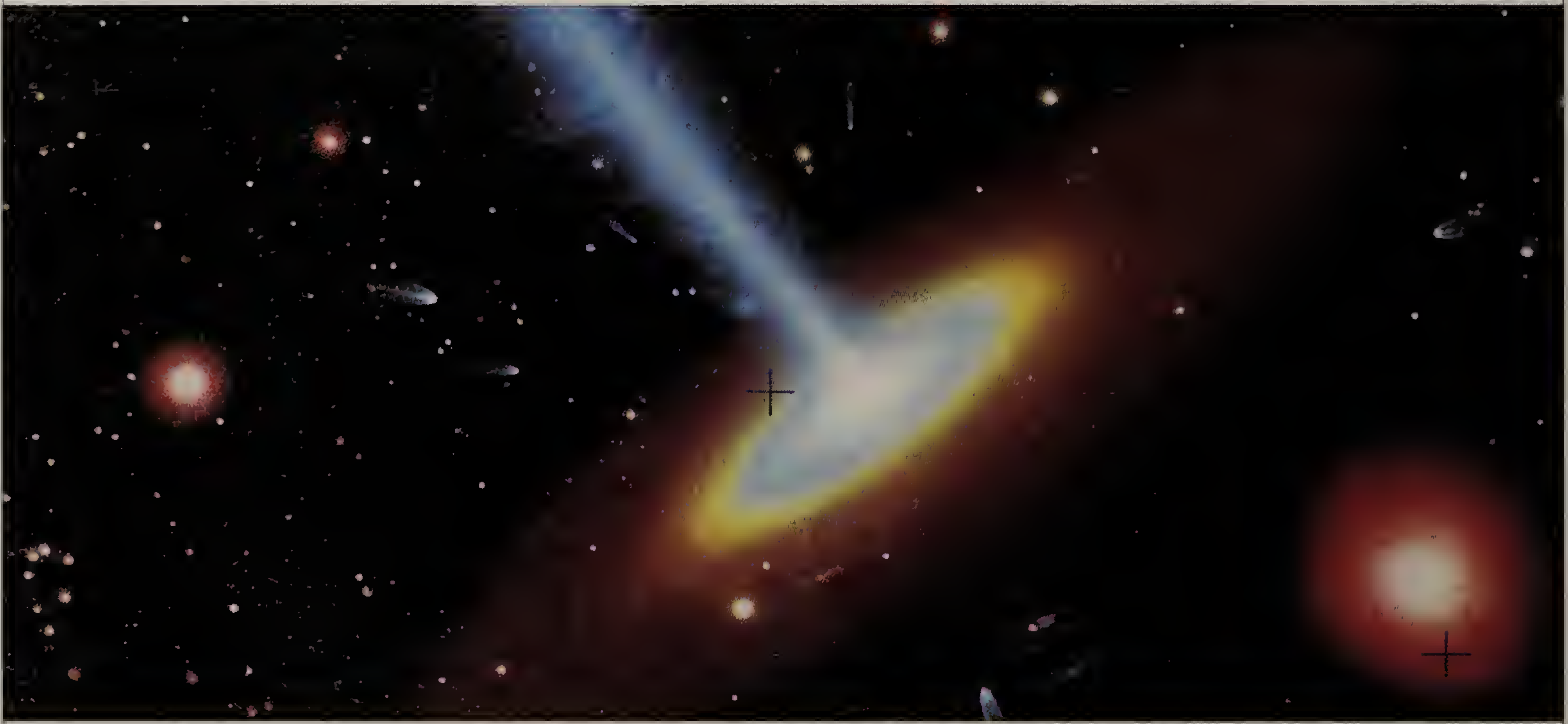

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Circle Reader Service **#57**

A Network World Supplement September 1996

INTRANet

So, what's it gonna cost?

Intranets often start out cheap then turn strategic. A guide to cost assessment. Page 36

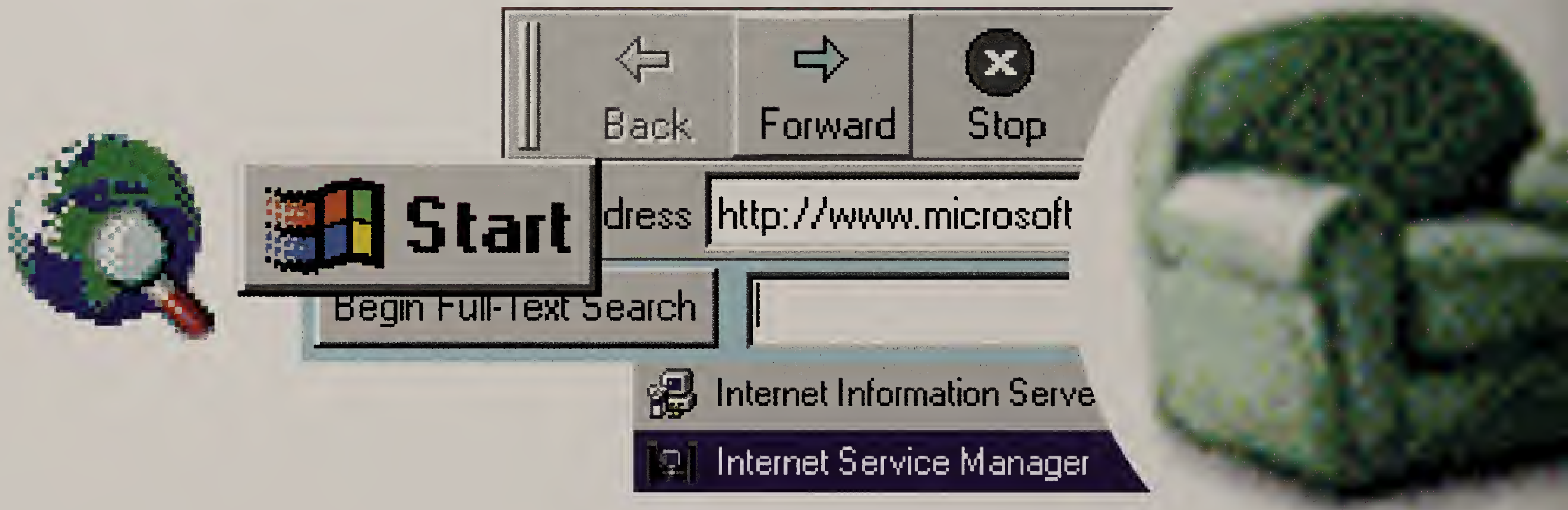
Also inside

- Intranet-based help desks
- Review: Microsoft's FrontPage
- Stocking the intranet toolbox
- If I could do it again...
- Net Rx for team Mayo
- Primer: Common Gateway Interface

Capitalizing on Internet Technologies

Microsoft Windows NT Server 4.0

lets you build



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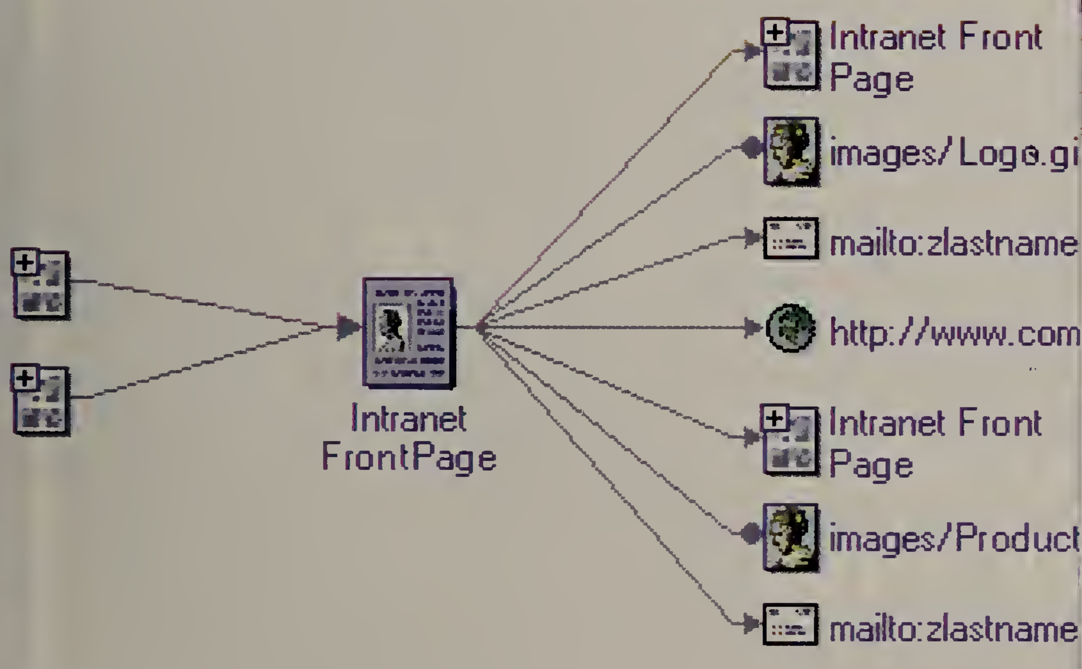

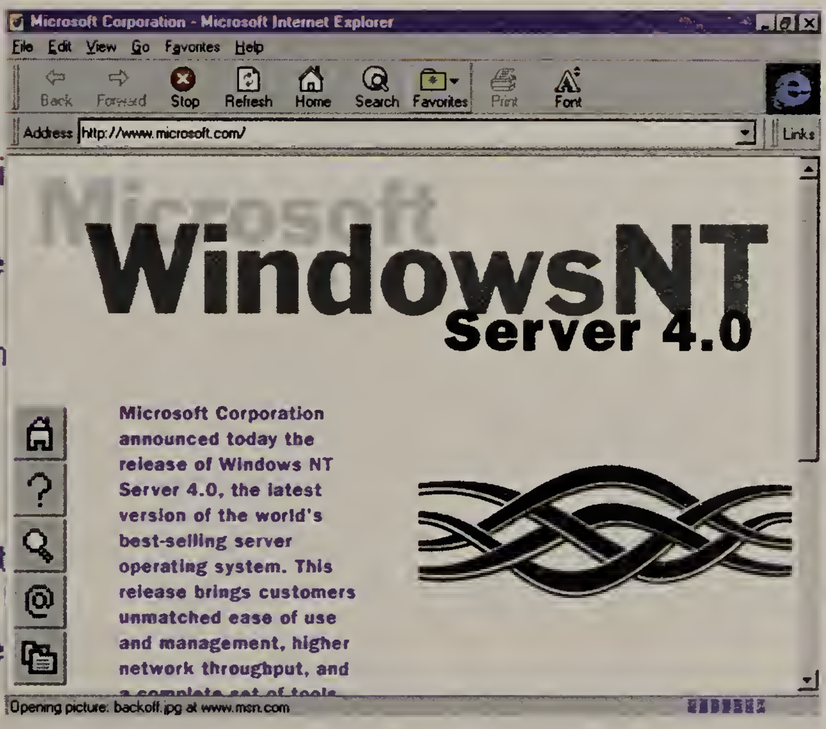

Microsoft Corporation announced today the release of Windows NT Server 4.0, the latest version of the world's best-selling server operating system. This release brings customers unmatched ease of use and management, higher network throughput, and a complete set of tools

Opening picture: backoff.jpg at www.msn.com

New Windows NT® Server 4.0 extends beyond file, print, application and communication services to offer a complete and integrated Internet and intranet platform. You can easily expand your existing network to include the Internet and intranet because Windows NT Server 4.0 comes with Microsoft Internet Information Server and Microsoft FrontPage web authoring tool included—and Microsoft Index Server is free off the Web.* Innovations like PPTP, MultiLink Remote Access and DNS make it even easier by offering you secure, flexible, high-bandwidth communication across the Internet. And, of course, Windows NT Server supports all standard Internet protocols so you're never locked in or left out in the Internet cold. Windows NT Server 4.0 performance is better too: It offers over twice the network throughput and is 35% more scalable than Windows NT Server 3.51. Most importantly, Windows NT Server is easy to use. With features like the Windows® 95 interface and wizards that automate common administrative tasks, you can move on to more important things, like lunch. If eating somewhere other than at your desk sounds like something you'd be interested in, take a closer look at Windows NT Server 4.0 at our Web site.

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Circle Reader Service **#29**

INSIDE

IntraNet

September 1996
Volume 1, Number 4

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Webized help desks provide a great way for IT managers and their users to stay afloat while grappling with technical problems.

26 Net Rx for Team Mayo

How and when do you formalize support of grassroots intranet efforts? The Mayo Medical Center addressed this thorny question using a team approach that mirrors its approach to medicine.

30 Get Tooled

When it comes to a toolbox, craftsmen can be mighty fussy: They want just the right hammer or that certain wrench. Intranet builders are no different, but they definitely don't have the luxury of being so particular.

33 If I could do it again . . .

Five intranet managers dissect the intranet choices they've made and reflect on what they would do differently given the chance.

36 COVER: Shopping for an intranet?

It's hard to resist the urge to put up an intranet, what with the low cost of entry and the enticement of a universal user interface. Just make sure you're not caught by surprise: There's more to this than just window dressing. (Cover photo by Neal Farris)

42 Management maneuvers

Amdahl Corp. has been running its own internal Web projects since the first browser went into beta and doling out advice to its clients about intranets for about that long too. In this Q&A, Steven Telleen, director of the company's IntraNet Solutions Group, shares the insight he's gained.

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Ask Dr. IntraNet 10

In this issue: Loading up browsers' fun features, and what to look for in a content-management system.

IntraNet Handbook: The Common Gateway Interface 10

CGI opens the door between Web servers and the back-end applications they run to enhance the intranet.

Review: Microsoft's FrontPage 15

This utility provides an answer to one of the great problems of intranet development and management: How to create and maintain Web content.

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The corporate intranet is all about collaboration, and everybody wants into the act. The collaboration tools category is booming with announcements of new products and add-ons for existing ones.

IntraVert: By Mark Gibbs 46

A lesson for intranet managers: Gibbs tells the tale of the legendary King Canute and his attempt to turn back the tide. Do like old 'Nute and you'll end up mishandling the intranet.

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From the Editor

Hands down, no question about it: Developing a pilot or departmental intranet can be done on a shoestring. And even though you won't have to come up with much scratch to build your net, you might still be able to reap considerable savings.

The Mayo Clinic, for example, is trying to nurture multiple grassroot Web projects that may ultimately enable the institution to do away with many published documents, including an enterprise directory that costs more than $150,000 a year to print and distribute. Smaller publishing efforts, such as putting patient care guidelines on its Web, could save $40,000 per year if the corresponding hard copy is eliminated, says Brian Kaihai, an IS planning analyst at Mayo (see page 26).

As an alternative to traditional publishing, intranets save paper, printing and distribution costs. But if you only look at intranets from that perspective you might miss the point.

Intranets are not only about saving money. Rather, they're about building the information infrastructure that will take companies through the '90s and beyond. Intranets are "about laying the roads and bridges that will be used for years to accomplish business goals," says Rob Rowe in our cover story (see page 36). Rowe is executive vice president of B.R. Blackmarr & Associates, a Dallas-based firm that helps companies determine the costs and the financial returns associated with intranets.

The folks at the Mayo Clinic understand this. While they certainly appreciate the potential cost savings they may reap from the intranet, they are most excited about the improved patient care they'll be able to deliver. Nurses and doctors will be able to jump on terminals and get current treatment information. "We can't begin to put a price on that," says Steve Sponsel, who heads the Web Support Group at Mayo.

Don't sell the intranet short. Make sure your company knows just how valuable the technology can be.

Beth Schultz, Executive Editor (bschultz@nww.com)

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VR gets real

Can you standardize reality? Well, maybe in the virtual three-dimensional world where a new specification is up for grabs.

Virtual Reality Modeling Language (VRML) 2.0 was unveiled recently by the VRML Architecture Group, a consortium assisted by Apple Computer, Inc., Microsoft Corp., Netscape Communications Corp., Silicon Graphics, Inc. and others without which a virtual reality standard would have little meaning.

VRML 2.0 jumps from the static three-dimensional world provided in the year-old VRML 1.0 to support interactive (read: Java) virtual reality.

"This is perhaps the single most anticipated announcement from the 3-D graphics community," says Kathy Klotz, an analyst at Dataquest, Inc., a market research firm in San Jose, Calif. She cautions, however, that VRML 2.0 must be standards-compliant and standard-setting. In other word, it must support open architectures and be accepted by developers as a usable tool.

In fact, VRML 2.0 has been accepted as a draft specification by both the International Standards Organization and the International Electrotechnical Commission. Check it out at vag.vrml.org.

Novell finds intranets poetic

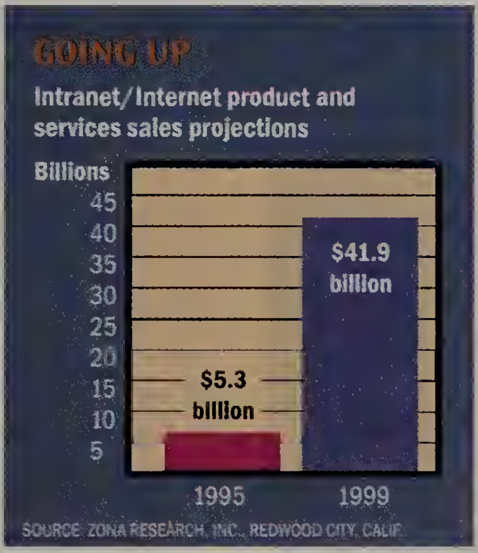
Novell, Inc. officials once recited Word Perfect sales pitches to a rap beat, but to market their new intranet offering they turned to limericks:

Your right choice is
IntranetWare
It has an advantage that's
just not fair
It's fast as hell
And already runs well
On networks from Hong Kong
to Delaware.

The technology's better than the poetry, says Steve Markman, executive vice president and general manager of the Novell Products Group, which unveiled IntraNetWare last month.

"The full-service intranet is Novell's game to lose," Markman declares.

IntraNetWare, scheduled to ship in October, is built of the stuff Novell knows. It bundles: NetWare 4.11 (code-name Green River), NetWare Web Server 2.5, Netscape Communications Corp.'s Navigator browser, a gateway between TCP/IP and Novell's IPX/SPX and a multiprotocol router for WAN connections. To be marketed separately are messaging and collaboration functions in Novell's GroupWise and management functions in ManageWise.



GOING UP

Intranet/Internet product and services sales projections

SOURCE: ZONA RESEARCH, INC., REDWOOD CITY, CALIF.

IntraNetWare can manage users as objects on a directory tree, setting permissions, access and even home page attachments, Markman says. Novell is porting its NetWare Directory Services (NDS) to other platforms, including Windows NT, so IntraNetWare's universe of control is expanding.

Frankenberg and Markman say intranets play to Novell's strengths and the market is Novell's to lose.

The intranet plays to Novell's core strengths, unlike some other recent pursuits, notes Robert Frankenberg, Novell's chairman and chief executive officer. In the past few years, Novell has unsuccessfully pushed AppWare, Word Perfect, Digital Research and the super-NOS, to name a few ill-fated projects.

"We've built some potholes along the way," Frankenberg says.

Novell representatives stressed the company's intranet offerings will support open standards. Timelines and details are to be announced at NetWorld+Interop '96 this month.

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Sept. 16-18; Oct. 21-23
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Intranet Forum at Data Warehousing Conference
Phoenix
Sept. 17-19
DCI: (508) 470-3880

Microsoft Explorer '96
Santa Clara, Calif.
Sept. 17-19
Microsoft: (800) 767-2336

Web X, The Internet Event for Business
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Sept. 24-26
Blenheim: (800) 829-3976

Firewalls, Web & Internet Security Conference
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Sept. 30-Oct. 1
National Computer Security Association:
www.ncsa.com

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Online World Conference and Expo
Washington, D.C.
Oct. 28-30
Online World: (203) 761-1466
www.onlineinc.com/oworld

Field & Sales Force Automation Conference
Atlanta
Nov. 12-14
DCI: (508) 470-3880

DB/Expo '96
New York
Dec. 2-6
Blenheim: (415) 9[illegible]

hot links

Next, Netscape play nicely

Let's get this straight: Steve Jobs is complaining of somebody's arrogance?

Just a few months ago, the often-volatile chairman of WebObjects developer NeXT Software, Inc. observed that "Netscape treated NeXT like I'd expect to be treated by Microsoft, and Microsoft treated us like I'd expect from Netscape."

Microsoft Corp., it seems, has demonstrated its experience at nurturing those third-party developers, something Jobs was sometimes accused of neglecting during his Apple Computer, Inc. tenure. And the younger and less experienced Netscape has not shown it understands the importance of third party support.

Now, it seems NeXT and Netscape Communications Corp. have made peace. NeXT has licensed Netscape's Open Network Environment (ONE), an intranet/Internet development platform with support for SunSoft, Inc.'s Java and JavaScript programming languages. By writing to Netscape ONE specs, NeXT's tools will be compatible with other Netscape ONE supporters.

By incorporating Netscape ONE, NeXT gets to add Java virtual machine support, the Java Runtime Interface and related client/server tools to its WebObjects development suite.

THE NUMBERS ARE IN

An exit poll users attending Network World's "Intranet: Technologies, Tools and Strategies" technical seminar reveal a shocking figure: Users say they are already spending some 25% of their IT budget on intranets. Less surprising was how these users prioritize intranet concerns. Topping the list was security. Issues such as cost and staffing requirements brought up the rear.

Attendee Profile

	Average
No. of employees in organization:	12,830
Total IT employees:	677
Total corporate locations:	443
Current Intranet users:	5,081
Current IT budget:	$10,330,810
Current Intranet budget:	$2,551,612

Primary intranet concerns:
On a scale of 1-5 (1, least important; 5, most important)

	Ranking
Security:	4.6
Performance:	4.2
Integration:	4.1
Scalability:	3.9
Planning:	3.7
Standards:	3.6
Return on Investment:	3.6
Tracking:	3.4
Cost:	3.4
Staffing:	3.1

Seminar series

Network World is expanding its popular Intranet Technical Seminar series by adding a second day focused on security, connectivity and management.

The current "Technologies, Tools and Strategies" seminars are scheduled for:

Washington D.C., Dec. 12
Atlanta, Dec. 5
San Francisco, Dec. 10
Morristown N.J., Jan 21
Philadelphia, Jan. 23
Irvine, Calif., Feb. 11
Dallas, Feb. 18.

The Security, Connectivity and Management seminars are held the following day in the same cities. The courses are $395 each, or $695 for both. Call (800) 643-4668 for reservations.

Apple blossoms with Notes

In the latest tale of the strange bedfellows, Lotus Notes comes to Apple Computer, Inc. servers with the help of IBM.

Lotus Development Corp. Notes 4.1 and the Notes Domino Web server are now shipping for Apple Network Servers running the IBM AIX operating system. The configuration supports Apple-only or heterogeneous environments. Apple has previously supported Notes as a client.

Running Notes 4.1 on Apple's systems requires the Notes Server for IBM AIX and AIX 4.1.4 or later versions. Notes Server for AIX costs $495 for a single processor server edition and $2,295 for a multi-processor server edition. Beta versions of Domino for IBM AIX are available for download from the Lotus Domino Web site (domino.lotus.com).

More information on Lotus Notes is available from (800) 346-1305; information on Apple Network Servers is available on apple.com or by calling (408) 862-3385.

Microsoft's airs intranet consulting plan

Microsoft Corp. officials have been loudly declaring that the company "gets" the Web, and now they've created some high-powered consulting services to make sure their corporate clients figure it out, too.

The Microsoft Service Advantage technical consulting organization will offer a selection of new programs and support designed specifically for corporations deploying enterprise communication solutions involving intranet, messaging and Internet services. Of course, the idea is that those services be based largely on Windows NT Server, Microsoft Internet Information Server and Microsoft Exchange Server.

Technology Consulting Blueprints from Microsoft Consulting Services are templates for particular categories of consulting projects. They offer information to help corporations define their needs, set goals, determine the right appoach and implement the project. The Blueprints include:

- Intranet/Internet Infrastructure Planning, to help customers design and build intranets based on current infrastructure.
- Intranet/Internet Applications Development Planning, which focuses on such collaborative applications as budgeting or human resources.
- Migration Services from Netscape to Microsoft Technology, featuring tools to switch from Netscape Enterprise Server to Microsoft Internet Information Server.
- Integrating Web Applications with Mainframe Transactions, offering information on linking TCP/IP-based intranets to host systems.
- Microsoft Exchange Server Planning, to help organizations deploy the new E-mail/groupware server technology on an intranet.

Microsoft Consulting Services also has teamed with New York-based consultancy Alexander & Alexander, Inc. to service corporate enterprise customers.

Accompanying the consulting programs is a new support service, called Premier Supportability Review. A Premier technical account manager from Microsoft will assess a corporation's intranet for potential problems and suggest preventive steps.

More information on the new services is available from Microsoft Consulting Services (microsoft.com).

When does it take three management applications to manage a single switch?

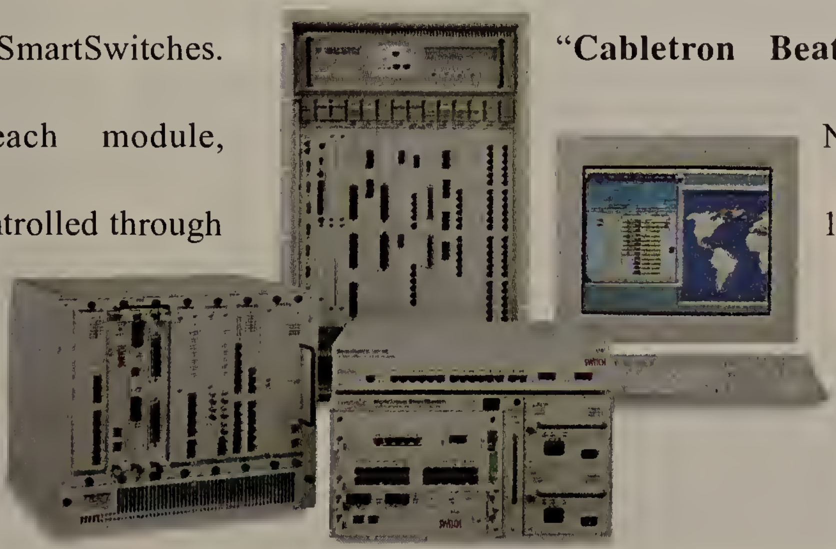
A: When you're managing Cisco's Catalyst 5000

If the riddle fooled you, wait 'til you try managing the Catalyst 5000. Not only do you need three applications—CiscoWorks, VLAN Director and Traffic Director—but none of them are integrated with your management platform. Even to perform simple configuration, you have to go through three different databases, each requiring its own polling. Think that's bad? Now imagine the frustration when struggling to manage several switches in the network. Yikes!

There's a better answer: Cabletron's SmartSwitches. Featuring embedded software on each module, SmartSwitches are easily monitored and controlled through point-and-click applications that run off any SNMP-based system, including Cabletron's own SPECTRUM. Every add, move or change is accounted for in a single database, resulting in seamless integration across the entire switched enterprise. You can even manage SmartSwitches from the Web!

There's no question about it...the SmartSwitch is the clear choice over the Catalyst 5000.

Need more proof? Give us a call at (603) 337-0929 for your free **"Cabletron Beats Cisco" Proof Kit** or stop by our Networld+Interop display in Atlanta (booths 1012 and 904).



SYNTHESIS

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Circle Reader Service **#28**

The Common Gateway Interface: Unlocking back-end applications

BY MARK GIBBS

Basic Web server functionality is pretty straightforward: Upon request from a browser, a server looks for documents, and if it can find them, delivers them. But it's easy to add some smarts to these masters of the corporate intranet.

All that's needed to extend a Web server's functionality are some scripts, or back-end applications the server can run when a Web client requests execution. The basic server functions are tied to the back-end applications via the Common Gateway Interface (CGI).

There are scores of reasons for writing Web server scripts. For example, in many organizations, the question: "How many vacation days do I have left?" can eat up a lot of time of human resource personnel. So, build a database and a back-end application for your Web server that lets employees check their own entitlements.

Scripts can manipulate incoming or outgoing data in any way you can program. The CGI, which sits between the Web server and the scripts, provides the key to such services.

Like Web servers, the CGI is pretty simple. Developed in the Unix world as a generic interface for Web server back-end applications, CGI is currently at release 1.1.

At the highest level, CGI connects datastreams from Web servers to back-end applications (see diagram). When a browser requests a URL that specifies an executable stored on the server, the Web server will (if the user has permission) load and run the program. The program is passed whatever data the URL contains. The executable will usually send a datastream back to the server which, in turn, will forward the data to the client.

If the request is to run a script, the URL will specify a subdirectory where the executable should be found. For the sake of system security and integrity, it is standard to only allow scripts to be run from specific subdirectories.

Four communications mechanisms are used to transfer data to the script. These mechanisms are environment variables, application command line, application standard input and application standard output.

CGI environment variables are defined as those set for all requests, those specific to the request and those specific to the client. Any program can read environment variables, which are simple data-transfer mechanisms.

The variables set for all requests are SERVER_SOFTWARE, which gives the name and version of the Web server software; SERVER–_NAME; and GATEWAY_INTERFACE, which gives what CGI version the server uses.

The request-specific variables are SERVER–_PROTOCOL, which gives the HTTP version the server handles; SERVER_PORT, which holds the TCP/IP port on which the request was received; and REQUEST_METHOD.

A number of variables allow the script to determine its own name, the real and virtual locations of files referenced in the request, the client's IP address and other information.

The most important environment variables are QUERY_STRING, which is the information that follows the question mark in the requested URL; CONTENT_TYPE, which specifies the data type of the request contents; and CONTENT_LENGTH.

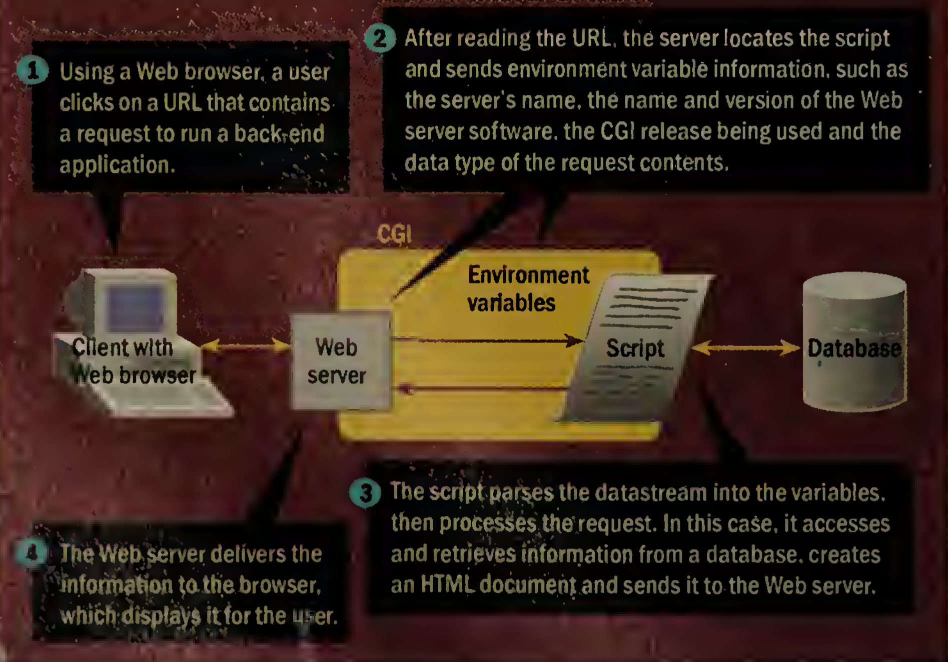
The client-specific environment variables are HTTP_ACCEPT, which enumerates the data types that the browser can understand; HTTP_USER–_AGENT, which holds the internal name of the browser used to make the request; and HTTP_REFERER, which should contain the name of the document from which the link was accessed.

Data from the client is usually generated when the user fills in a form and clicks on the Submit button. At that

See Handbook, *page 12*

RUNNING INTERFERENCE

Intranet managers can link Web servers to back-end applications via the Common Gateway Interface (CGI). Here's how it works:



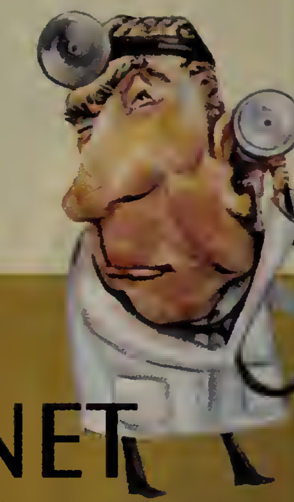
① Using a Web browser, a user clicks on a URL that contains a request to run a back-end application.

② After reading the URL, the server locates the script and sends environment variable information, such as the server's name, the name and version of the Web server software, the CGI release being used and the data type of the request contents.

③ The script parses the datastream into the variables, then processes the request. In this case, it accesses and retrieves information from a database, creates an HTML document and sends it to the Web server.

④ The Web server delivers the information to the browser, which displays it for the user.

Microsoft Corp., Netscape Communications Corp., Novell, Inc. and others offer CGI variants in the form of proprietary APIs.



ASK DR. INTRANET

David Morro is in for consultations. He'll help diagnose your intranet ailments or recommend corrective measures. Send your questions to the doctor via phone at (312) 283-0213, fax at (312) 283-0214 or the Internet at dr.intranet@nww.com.

How can my intranet take advantage of the new features in Microsoft Corp.'s and Netscape Communications Corp.'s next generation of Web browsers?

Some argue that the latest and greatest browsers from the Big Two could actually damage the user-friendliness of your intranet. They say the Web browser is rapidly transforming into a monster application with a large appetite for system resources, and most browser add-ons will go unused on your intranet.

However, these same browsers are issuing in an era of intranet interactivity with their built-in Internet phone and chat features. Netmeeting, Microsoft's Internet Explorer add-on, even allows multiuser whiteboard sessions. These features deliver on the promise of intranets to provide the collaborative workgroup abilities of classic client/server systems.

I say: bring on even more functionality to Web browsers. The future of intranet communications lies in the fully HTML-compatible E-mail client. You'll be able to let users view HTML E-mail documents, such as a frames-based annual report with links to intranet server Web pages or an on-line 401(k) sign-up form.

What should I look for in a content-management system for my intranet?

The need for a content-management system will most likely be driven by your need to decentralize the responsibility for editing and deploying content on your intranet while maintaining some semblance of order. So at a minimum, make sure the content-management software you choose employs a user-permission scheme that allows certain users to be locked from some files and given access to others.

You also should look for a system with revision control. In the event that the latest changes to your site have a problem, you want to be able to roll back the site to the last proven revision. The software should be able to perform and log version comparisons by searching for and identifying changes between revisions.

Morro is a Web architect at Interse Corp., a Sunnyvale, Calif.-based Web development firm.

Any forms-based process, such as capital expenditure requests, can be turned into back-end service applications.

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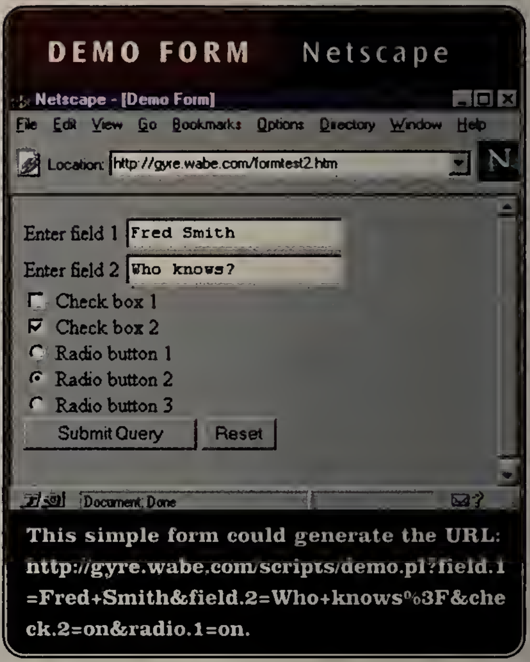
Handbook, *continued from page 10*

point. the data is sent with the URL specified in the form's ACTION tag. For example:

```
<HTML>
<HEAD>
<TITLE>Demo Form</TITLE>
</HEAD>
<BODY>
<FORM METHOD="get"
ACTION="/cgi-bin/demo.pl">
Enter field 1 <INPUT TYPE="text"
NAME="field.1" SIZE="20"
MAXLENGTH="80"><BR>
Enter field 2 <INPUT TYPE="text"
NAME="field.2" SIZE="20"
MAXLENGTH="80"><BR>
<INPUT TYPE="checkbox"
NAME="check.1"> Check box 1 <BR>
<INPUT TYPE="checkbox"
NAME="check.2"> Check box 2 <BR>
<INPUT TYPE="submit"> <INPUT
TYPE="reset">
</FORM>
</BODY>
```

This simple form (see screenshot) could generate a URL such as: http://gyre.wabe.com/scripts/demo.pl?field.1=Fred+Smith&field.2=Who+knows%3F&check.2=on&radio.1=on.

Or, data can be sent with a URL when the page contains a <ISINDEX> tag. In this case, the browser automatically adds a query form to the page. Filling in the text box and pressing enter will return the current document's URL with a question mark and then the query data appended. However, this method only works if a back-end application created the document in the first place.


DEMO FORM
Netscape
Netscape - [Demo Form]
File Edit View Go Bookmarks Options Directory Window Help
Location: http://gyre.wabe.com/formtest2.htm
Submit Query
Reset
Document: Done

Enter field 1 Fred Smith
Enter field 2 Who knows?
☐ Check box 1
☑ Check box 2
○ Radio button 1
● Radio button 2
○ Radio button 3

This simple form could generate the URL: http://gyre.wabe.com/scripts/demo.pl?field.1=Fred+Smith&field.2=Who+knows%3F&check.2=on&radio.1=on.

CGI ON THE WEB

Get more information on the CGI on Network World Fusion. Go to News+ then IntraNet Magazine.

NetworkWorld Fusion
http://www.nwfusion.com

The METHOD attribute of the FORM tag specifies the way data will be passed to the script. If the datastream is not too long — typically less than 256 bytes — the GET method may be used. This sends the data to the script via its command line and in the QUERY_STRING variable. The POST method is required for larger amounts of data.

And how does the script send data back to the browser?

Using any programming language, all the script needs to do is decode the datastream and break it into variables as appropriate.

Once that's done, the script can do anything that any other program can from the platform on which it is running. This includes accessing databases and sending and receiving E-mail. To get data back to the client, it simply writes to the standard output.

It's easy to write to basic CGI, but you'll want adequate Web server documentation since all sorts of issues come up with specific implementations.

Also, note that loading scripts from disk for each request can significantly drain system resources. Vendor-proprietary CGI variants address this issue by making the back-end applications operate as re-entrant, shared memory-resident modules. ⊜

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Microsoft's FrontPage 1.1:

Bringing in the next round of Web publishing tools

BY MARK GIBBS

Microsoft Corp. acquired the FrontPage Web publishing and construction tool from Vermeer Technologies, Inc.

Microsoft Corp.'s FrontPage provides an answer to one of the great problems of intranet development and management: how to create and maintain Web content.

The scale of this problem is not always obvious. In an intranet's early days, content can be created without much fuss. All you need is any old text editor and your HTML reference on hand. In no time at all, you'll have . . . well, to tell the truth, not a lot.

At best, you'll have a few pages that work pretty well. At worst, you'll have scores of pages with missing links, lost images and malformed HTML. The problem is that as the size of the Web you are building gets bigger, staying organized becomes increasingly hard.

Microsoft's FrontPage 1.1 not only addresses these issues but also automates many aspects of content development and includes tools to help plan the work.

FrontPage is a comprehensive package, containing a Web page editor, a Web content management tool, a Web server and a collection of Web server scripts that provide the mechanisms for creating and modifying Web content. Among the few improvements needed is a revamped frames editor.

PRODUCT CAPSULE

- **Name:** FrontPage
- **Current release:** Version 1.1
- **Price:** $149
- **Requirements:** Windows 95 or Windows NT, 16M-byte RAM minimum, 20M-byte hard disk, Winsock-compliant TCP/IP stack.
- **Vendor:** Microsoft Corp., of Redmond, Wash.
- **URL:** www.microsoft.com

There really is nothing quite like FrontPage. Its great strength is that it provides organization of all of the aspects of Web development.

Rolling out FrontPage

The product comes on six 3.5-inch disks with a minimal but adequate manual. It runs under Windows 95 or Windows NT. Installation, which is straightforward, takes about 10 minutes.

If you choose the standard installation, all three components are loaded — FrontPage Explorer (the Web structure viewer), FrontPage Editor (the editor program) and the Personal Web Server and its administration utility. Custom installation allows you to install any combination of these components.

With the full complement installed, you supply an administrator's name and password. Once your system reboots, the Personal Web Server will be launched from the start-up folder; after it has determined the name of the machine it is on, you're ready to begin.

FrontPage also includes a diagnostic utility that will check the functioning of the Windows socket implementation, the ability to use the name "localhost" to refer to the local machine and other attributes of the local TCP/IP environment.

Heart and page

From the viewpoint of FrontPage, the term "Web" simply means a collection of related HTML pages. This is really a convenience for the purposes of editing and management, as all of these groups may appear as an integrated whole when viewed with a Web browser.

The heart of the FrontPage system is a collection of back-end Web server applications Microsoft calls Server Extensions. These extensions are used to create named groups of pages referred to as Webs, as well as create and manage individual pages.

There are also Server Extensions called WebBots that can be embedded in pages. These act on the contents of pages when they are saved or when they are retrieved by users — for example, to automatically index changes made to a Web page's contents.

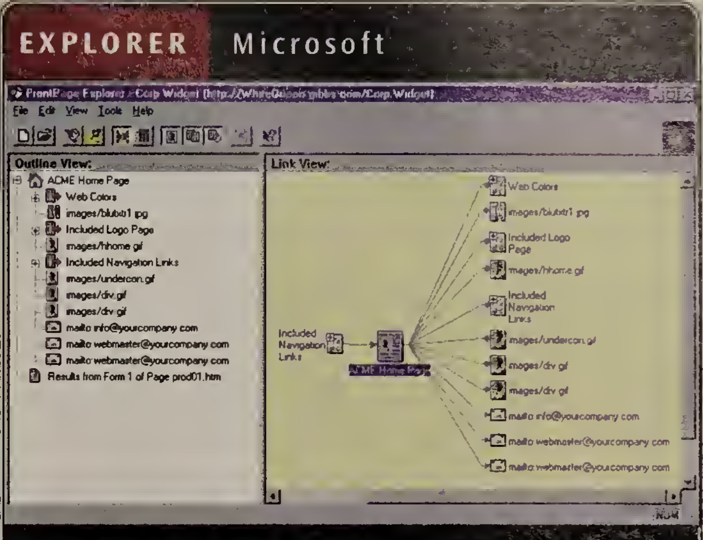
Server Extensions for O'Reilly & Associates, Inc. WebSite and the FrontPage Personal Web Server are included. Versions for a wide range of Web servers, including Microsoft Internet Information Server, can be downloaded from the Web at www.microsoft.com.

Exploring FrontPage

The FrontPage Explorer utility is for examining and administering a private Web. It can show the Web from several viewpoints: An Outline View shows Web contents as a tree, a Link View shows linkages between pages, and a Summary View lists the attributes of each page.

From Explorer, you can list, open and delete existing Webs or create new ones. Creating a new Web can be done via a simple template or by using a wizard that leads you through a complex configuration process.

Templates for customer support, personal and project Webs are provided, along with wizards for developing a corporate presence and a bulletin board-type environment. Microsoft also provides a developer's kit so custom wizards can be created; this is downloadable from Microsoft's Web site.


EXPLORER
Microsoft
FrontPage Explorer - Corp Widget (http://WhiteQueen.gibbs.com/Corp.Widget)
File
Edit
View
Tools
Help
Outline View:
ACME Home Page
Web Colors
images/blubxt1.jpg
Included Logo Page
images/hhome.gif
Included Navigation Links
images/undercon.gif
images/div.gif
images/div.gif
mailto info@yourcompany.com
mailto webmaster@yourcompany.com
mailto webmaster@yourcompany.com
Results from Form 1 of Page prod01.htm
Link View:
Included Navigation Links
ACME Home Page
Web Colors
images/blubxt1.jpg
Included Logo Page
images/hhome.gif
Included Navigation Links
images/undercon.gif
images/div.gif
images/div.gif
mailto info@yourcompany.com
mailto webmaster@yourcompany.com
mailto webmaster@yourcompany.com
NUM

The Explorer utility, for examining and administering sites, can show the Web from several viewpoints.

FrontPage also supports importation of existing HTML pages, but there's a small potential gotcha in this: FrontPage will automatically store all in-line graphics in a subdirectory called Images below the Web's root directory. If your graphics are stored, for example, in the same directory as the documents, then after importing, the in-line images will be missing.

You'll need to go into the FrontPage Web document storage subdirectories and manually move the images from the default directory to the correct location. Microsoft should make this process configurable so that those who don't store their graphics in the Images directory can specify which subdirectory to use.

Controlling the Web

When a Web is first created, an administrative name and password must be defined. After that, additional administrative users can be added as needed.

Administrators are at the top of the food chain. They can create, modify and delete Webs, define authoring privileges and control user access. Authors can add, modify and delete pages and define user access. At the bottom of the power structure are the users, who can only access Webs if they have proper clearances.

All three categories can be restricted by IP address masks, providing firm control over who can do what kind of work on a Web from where on the network.

See Microsoft, *page 18*

PROS AND CONS Microsoft's FrontPage

Pros
- Provides sound Web management
- Features WYSIWYG page editor
- Has lots of automated features
- Offers broad Web server platform support through extensions

Cons
- Has a weak frames editor
- Needs improved importing

SUMMARY: You need this program.

RATING

Value for money	[illegible]
Intranet usefulness	[illegible]
Quality	[illegible]
Overall	5

1 is poor and 5 is [illegible]

Microsoft Office 95 users can get FrontPage 1.1 at a discounted rate of $109 — $40 off regular cost — through March 31, 1997.

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Circle Reader Service **#33**

Microsoft, *continued from page 15*

To allow specific authors to control only a subsection of a Web, you would simply create a separate Web for their work and link it to the main Web.

One of the most important functions FrontPage Explorer provides is the ability to verify a Web to identify broken links. From the list, you can edit the link, edit the page the link is in or add the problem to the task list.

The task list is one of the most powerful features of FrontPage Explorer. It allows you to define and track the work required to construct a Web. You can assign authors and priorities to tasks and track progress.

Finally, when you're in the Link View, by clicking on the plus symbol of an object icon, you can expand the view to show all of the objects that link to it and to which it links. By double-clicking on the object, you can launch the appropriate editor for that object type (such as image and sounds file). If the object is a Web page, you'll launch the FrontPage Editor.

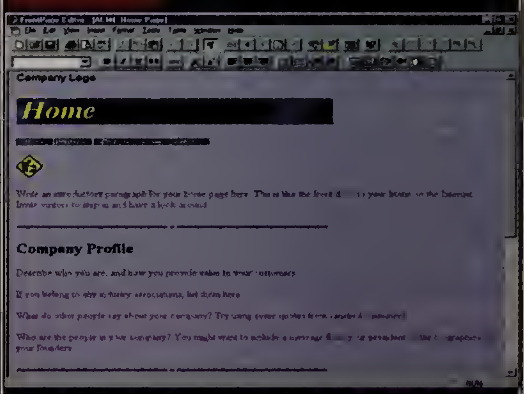
The FrontPage Editor is as close to what-you-see-is-what-get (WYSIWYG) as such utilities can get. As Web page editors go, it is one of the slickest.

Some of the old school feel that they lose some control of the appearance of documents with FrontPage Editor, as there is no direct access to the raw HTML of the page. While there might occasionally be a need for such low-level access, for intranet purposes — particularly when some authors may be less skilled — such facilities are unnecessary.

New pages can be created in the editor, and the dialogue box offers 28 page types — ranging from a blank page to wizards for creating forms and pages with frames.

Creating a page with frames is clumsy, and this is one area where FrontPage is weak. Ideally, frame editing would be done on a page that was laid out with the frames as you would expect to see them. With FrontPage, the frames wizard creates a separate page for each frame, and frame content editing is done on each frame page in isolation. The only way to see the final result is to call up the target page in your browser.

EDITOR Microsoft



The Editor utility provides a WYSIWYG view of a Web page.

The editor can also define the hot spots of mapped images — images that have areas in which a mouse click will lead to different URLs.

But even more compelling are the WebBots. These are invoked by special tags embedded in the HTML that add data to pages automatically. For example, the scheduled image and scheduled text WebBots add an image or text to a page between certain dates and times. This is useful for seasonal images or short-lived news items.

Other WebBots handle form output. These allow data to be saved into files, added to threaded discussions, be used to register for server access or to execute a custom script.

Intranet victory

The first generation of Web editors were crude applications that simply pasted arcane HTML strings into documents. The second generation provided WYSIWYG editing (or at least as far as possible).

FrontPage is the first real tool of the third generation. It provides not only WYSIWYG editing, but also an integrated Web construction and management environment. It's the best system we've seen so far for group Web construction. ⊜

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Circle Reader Service #30

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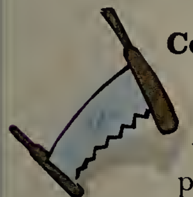
A growing number of vendors are offering intranet suites, but users still get to integrate their favorite browsers or custom applications.

Come, collaborate on the intranet

BY PEGGY WATT

The corporate intranet is all about collaboration, and everybody wants into the act. Legacy systems and data warehouses, LAN and Notes servers, and, of course, cross-platform clients are all getting acquainted through internal Webs.

Consequently, the collaboration tools sector is booming with announcements of new products and links for existing ones. Many applications developers are finding ways to Webify their programs, and in the process, end up groupware-enabling them, too. The Notes players are making sure their applications fit nicely with others on the intranet. And yet others are seizing the need for tools to manage the whole bunch of them.



Collaboration tools

One such player is start-up Active Software, Inc. (activesw.com), which last month shipped its debut products. The products, which make up the ActiveWeb family, are designed to help existing network-based applications communicate more easily by using Web technology.

The key component of the ActiveWeb family is ActiveWeb Information Broker, which is not a Web server but can run on the same machine. It manages and filters data from diverse sources, routes queries to databases and other servers, and supports multiple client broadcasts.

Other ActiveWeb components are the ActiveWeb dbAdaptor, which links SQL databases into the fray, and a series of Java-based administration and development tools.

Early users typically implement the ActiveWeb suite in systems that monitor customer transactions, such as order entry or inventory management, says Paul Koenig, vice president of marketing for Active Software. For example, a monitor function can update users when information or events change, such as inventory status.

Active Software has shared and codeveloped technology with such Web veterans as Terisa Systems, Inc. and Sun Microsystems, Inc. Active implements some Terisa security technology in its Java tools and also licensed some of its visual Java technology to Sun.

ActiveWeb is initially available for Sun's Solaris and Microsoft Corp.'s Windows NT operating systems. Pricing ranges with the number of licenses, but begins at $4,995 for the ActiveWeb Developer Suite, including the ActiveWeb Information Broker, administration tools, a Java adapter and tools, and a dbAdapter for one database. Additional dbAdapters cost $3,000 each.

Frontier Technologies, Inc. (FrontierTech.com) is now shipping an intranet application suite that includes collaboration tools. The collection, called Intranet Genie, bundles some existing Web technology from Frontier with new components to provide all the necessary software for a basic intranet.

Users can buy Frontier's modules individually if they prefer to use other products for some functions. However, using all of Frontier's components provides single-screen installation and administration, notes Larry Hitchcock, business development director at the company.

Intranet Genie's primary components include the SuperWeb server, a domain name server, a news server and an E-mail server, as well as a selection of groupware applications that includes a scheduler, forms and reports, and a workflow manager. For the client, the suite includes Frontier's Tapestry browser, E-mail, a news reader, a WYSIWYG page painting tool called WebDesigner and remote administration functions.

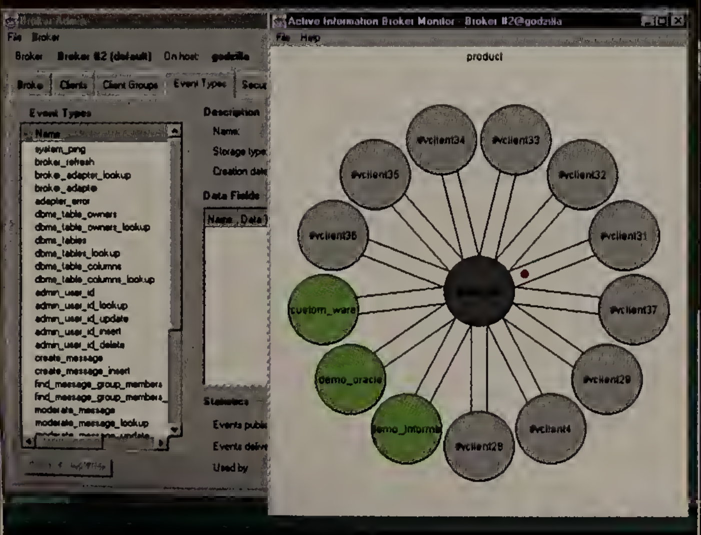
Installed as a suite, Intranet Genie provides multilayer security, says David Yunck, internet marketing specialist at Frontier. The client E-mail supports Secure/Multipurpose Internet Mail Extensions and the suite supports RSA Data Security, Inc. Secure Sockets Layer (SSL). It can be used with any third-party firewall, he adds.

Frontier's existing CyberSearch application is part of the client component, and the Verity, Inc. search engine is available on the server; the combined applications can search both online and local data.

Also bundled is Software.com's Post.-Office message transport agent, which enables Novell, Inc. NetWare users to tie into the intranet through an IPX-IP conversion.

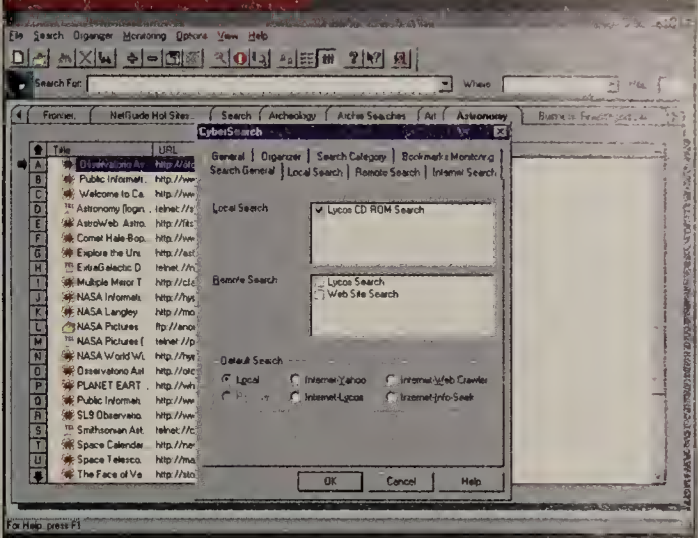
Intranet Genie is initially available for Windows NT and by the end of the year will ship for the Windows 95 platform as well. Pricing ranges with the number of user licenses; for example, the cost for 250 users on one server is $14,400.

ACTIVEWEB Active Software



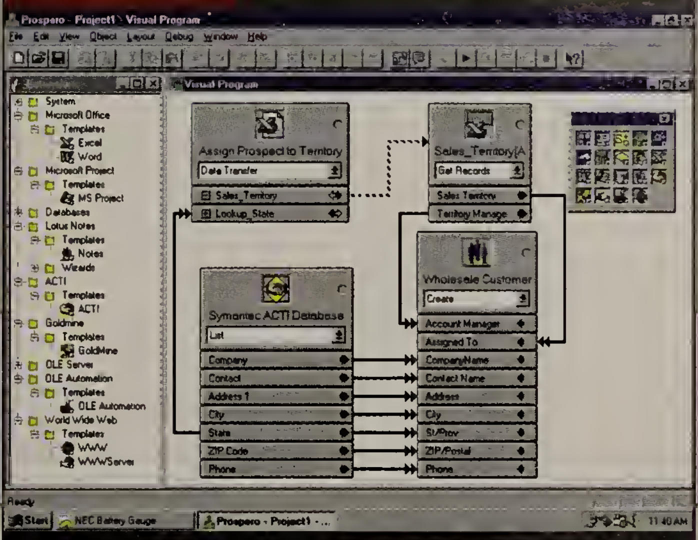
The ActiveWeb Information Broker provides central management for local and remote files and resources.

INTRANET GENIE Frontier Technologies



The CyberSearch component of Intranet Genie searches and categorizes both local and online resources.

PROSPERO Oberon Software


Prospero - Project1 - Visual Program
Assign Prospect to Territory
Sales_Territory
Symantec ACT! Database
Wholesale Customer

Prospero's object-oriented tools take advantage of Web technology and let users link functions and files.

Support for Lotus Development Corp.'s Notes in the intranet is starting to appear from third-party developers. One of those companies, InfoImage, Inc., recently shipped Instant I-Net, an applications suite that runs on Lotus' new Domino Web server.

The suite includes eight common intranet applications, including a document library, phone directory, job postings and human resources software. The applications are already built but can be tailored as needed, says Jon Michaels, a regional manager at the company.

Corporations flow their existing documents into the Instant I-Net applications so the information can be accessed and displayed as HTML pages. Users also can retrieve the pages from any Notes client, he adds.

"It's intended to take away the pain of having to develop each of these applications," Michaels says.

Instant I-Net is priced at $995 per server. When bundled with a single-processor Notes server and Domino, it costs $1,495. Demos are available at domino.infoimage.com.

Oberon Software, Inc. (oberon.com) has updated its Prospero tool with the ability to support data sharing among Web pages and a slew of desktop applications. Prospero 1.1 can move data between HTML format and a variety of relational database and word-processing file formats.

The product's Web Building Block component can parse HTML tables and forms and

See Product Watch, *page 20*

Many intranet applications are being released on multiple platforms, notably Macintosh and Windows so sharing files is a cinch

Product Watch, *continued from page 19*

copy a Web page's contents to a local file. The Web Server Building Block can convert data from desktop applications into HTML on several Windows NT-based Web servers, including Microsoft's Internet Information Server, Netscape Communications Corp.'s Communications Server and O'Reilly & Associates, Inc.'s WebSite.

The Prospero update also supports enhanced OLE and provides a series of visual programming wizards to let users create building blocks for data links between specific or custom applications.

Prospero 1.1 is available in versions for the Windows family. It retails for $695.

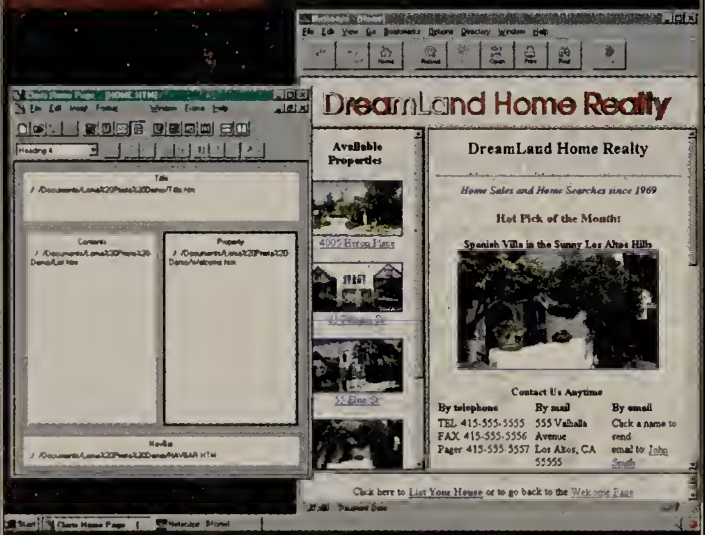
Where there's Web technology, Java soon follows; and Java has made its way onto an established groupware-generator from Wall Data, Inc. (walldata.com).

The software, called Salsa, extends groupware functionality to most applications by enabling networked users to share programs without needing to know where they are stored or even what they are. Users can build these links through point-and-click, drag-and-drop visual tools.

Now, with the use of a Java applet, users can E-mail messages on an intranet that contain only the pertinent information and automatically launch the application as needed to read it. Share functions launch an agent that finds the necessary Salsa-enabled application anywhere on the intranet, says Kris Kelsay, a product marketing manager at Wall Data.

The Java functionality is added in Salsa 2.0, which is shipping now for $350.

HOME PAGE Claris



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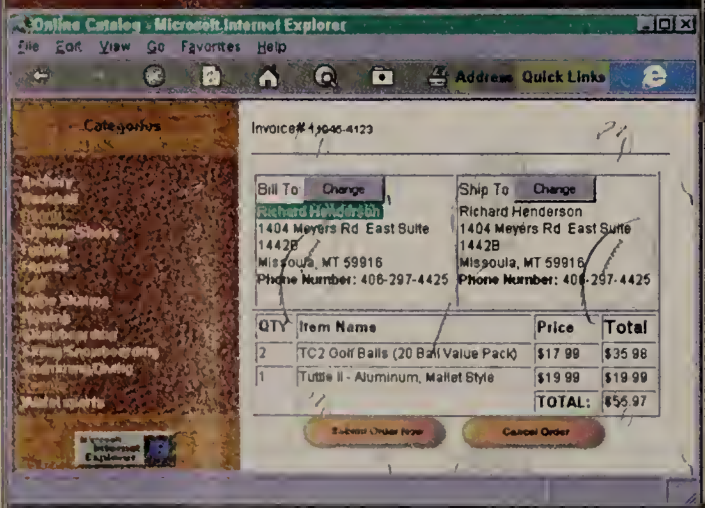
The Web page design tool Home Page lets users open a window and directly edit HTML code.

QUICK CICS Attachmate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		TOTAL:	$55.97

Using any browser interface, users can retrieve a mix of local and host data and view it as HTML code.

Authoring/development tools

Not surprisingly, Java continues its intranet penetration.

Natural Intelligence, Inc. (natural.com) is now shipping an update to its Java development environment for Apple Computer, Inc.'s MacOS operating system. The software, called Roaster Developer Release 2.1, adds a debugger that supports both source code- and byte code-level operations and a variety of stepping and breakpoint options.

The Roaster update also is faster than the earlier versions and includes some fixes in compiler operations, according to Natural Intelligence. Planned for the next version are visual development tools and just-in-time compilation.

Subscriptions (including updates and support) to the Roaster Development Environment cost $199; a nondeveloper release is priced at $129.

Another Java development tool is now available, following an open beta test. Jamba, from Aimtech Corp. (aimtech.com) is a visual authoring tool that generates applets without requiring programming or scripting. The Windows 95-based tool provides menu access to many Java functions so it's easier for developers to add multimedia to Web sites through Java applets. The development environment is a WYSIWYG page layout-style workspace.

Jamba accommodates ActiveX controls, so it supports Microsoft's multimedia model, as well. Aimtech also is developing an ActiveX player that supports Microsoft's Active Document specification. This will let Jamba run in an Active Document container application.

Jamba also supports Common Gateway Interface (CGI) scripts and Java Database Connectivity. The tool comes with a selection of templates to help developers get started.

Jamba is priced at $495.

Java got another intranet endorsement from NetManage, Inc. (netmanage.com), which has licensed the Netscape Open Network Environment technology for use in its intranet product line. The license lets NetManage support JavaScript in its Chameleon product family of TCP/IP applications.

NetManage also intends to support Microsoft's ActiveX and VB Script in its application suite, says Willie Tejada, vice president of corporate marketing at the company.

NetManage also recently expanded its cross-platform support with the release last month of Chameleon NFS for MacOS. Like NetManage's Windows Chameleon suite, the MacOS package includes Internet access, E-mail and host connectivity. Macintosh users can mount the NFS server through the MacOS Chooser menu.

Chameleon NFS for MacOS is priced at $395, but is available through Nov. 1, 1996, at an introductory price of $195.

Claris Corp. (claris.com) is now shipping cross-platform design tools for Web pages. The new page design program, called Claris Home Page, is for both Macintosh and Windows systems. It is intended for users who don't want to learn HTML, Claris says.

Users can generate the Web page code through Menu and Toolbar commands, or can edit HTML code directly if they choose. The program supports Java applets, JavaScript and CGI applications.

Home Page tools also support such newer Web page functions as frames, split screens and a table editor. The program also can maintain libraries of frequently accessed data and templates, and retains live links when the library contents are activated.

Home Page is available in versions for the MacOS and both Windows 95 and Windows NT, each priced at $99.

Just the Facts

TAPPING DATABASES

Early research suggests that almost half of all companies plan to build database-driven intranet applications by the end of 1997. A higher percentage will build applications that mix documents and databases.

— International Data Corp.

Legacy links

Drawing host data into the intranet and — even better — displaying it in a Web-like format is giving new life to data warehouses and spurring the growth of many intranets. Thanks to an increasing selection of browser-to-host connectivity tools, users can post their own queries and generate reports through browsers. Many find this much easier to handle than most of the client/server configurations that tackled the same task just a few years ago.

Attachmate Corp. (attachmate.com) is shipping this fall a selection of Web-to-host tools that extend several of its current products.

"Intranets provide the interface, so the users don't even need to know the source of the data, just that they can get it easily," says Scott Garvey, product director for servers and tools at Attachmate.

New Attachmate tools include Quick CICS, which provides a graphical front-end directly to CICS programs. The related QuickDB is a database driver that enables a LAN-based thin client to access legacy information, including data in a relational database, via a browser.

Quick CICS and QuickDB each work with middleware from Attachmate's Extra Developer Series, which handles some of the conversion from the host to the graphical user interface. The configuration can be tailored via visual development tools, such as Visual Basic and Visual C++.

According to Garvey, business logic can be added at the LAN server level, to control access or functions. IT managers don't need to rewrite the host application, but change it at the point of the LAN server. Meanwhile, the host operates as if it is communicating with a dumb client.

The QuickDB client and server software costs $195 and $4,995, respectively. Quick CICS is initially available through a preview program for existing customers. ⊜

Intranet applications developers are responding to user requests for unified, often automated, setup and administration functions.

Rather than competing with internal Webs, Notes users are working with them. Vendors are responding with appropriate support programs.

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*Circle Reader Service #***32**

Intranet-based help desks to the RESCUE

For IT managers and their users who would rather swim than sink, Web-based help desk software provides a great way to stay afloat while grappling with technical problems.

BY ELISABETH HORWITT

The new breed of intranet-based help desk services seems like pure good news, both to network administrators and to the users who feel they've been set adrift in a sea of technical problems.

Users with an ailing printer or an abstruse installation manual can now send their yelps directly into the help desk system, with a click of the Web browser. And that, IS executives are finding, translates into major productivity gains for both sides of the user support hotline.

Help desk managers don't have to waste their time eliciting the exact nature of the problem from users and then keying everything into the trouble-ticketing system. And users can grab the help desk's attention without having to get a warm body on the line.

Users who tap into the intranet-based help desk get answers more quickly or at least are able to log problems ahead of peers who still rely on the phone, says Hugh Bishop, director of emerging technologies research at Aberdeen Group, Inc., a Boston-based consultancy. "Often help desk lines are busy, or you're calling in an off hour and no one is there to answer."

And yet, help desk managers report, it's a real challenge getting users off the phone.

"The main problem for us right now, and for other companies I've talked to, is to get people to use the Web to access help desk personnel and resources," says Tom Barthold, manager of help desk operations for Autodesk, Inc. in San Rafael, Calif.

At Autodesk, only 5% to 10% of help desk queries come in via ARWeb, the Web-based front end to the Remedy Corp. Action Request System (ARS) implemented by the company, Barthold says. Other companies seem to be making a bit more headway, reporting that as many as 25% of user queries are now submitted via the Web.

Even these small percentages have made a positive difference to help desk productivity, managers report. Autodesk saves half a manday for every 100 calls that come in over the Web, instead of via the telephone or through E-mail, Barthold estimates. "That's half a day you can spend down in the lab getting training on NT."

Part of the time savings is derived from the ARWeb form, which users must complete before sending in a trouble ticket, Barthold says. The information allows the help desk system to automatically route the call to the appropriate techni-

See **RESCUE**, *page 25*

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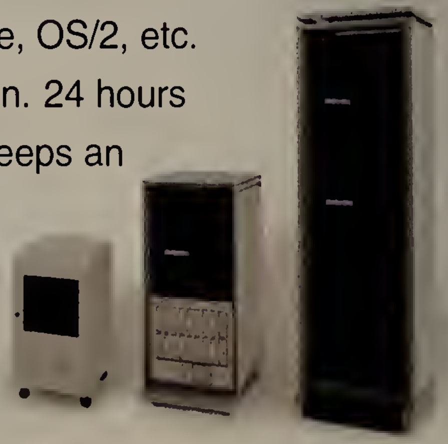

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Circle Reader Service #40

RESCUE, *continued from page 22*

cian, and allows the technician, in many cases, to start working on the problem immediately.

In contrast, users often omit key information in their E-mails. This means the help desk administrator has to chase them down, Barthold says.

Telephone calls require a help desk manager to laboriously take down relevant information from the user, and then figure out where to route the call if it requires special expertise, help desk managers say.

Furthermore, with the help of point-and-click graphics, search engines, Common Gateway Interface connections to databases and URL links to relevant Web pages, IT can help users navigate to the resources, such as product data, they need to resolve their own questions and problems. This, in turn, frees up time for help desk managers.

"The advantage of Web-based help desk access is that it empowers users to help themselves, which can result in improved customer satisfaction and lowered technical support costs," says Allen Bonde, a senior analyst at The Yankee Group, a consulting firm in Boston.

Users' phone habits are hard to break, says Tom Barthold, manager of help desk operations at Autodesk, Inc.

PHOTO: DAVID POWERS

Multimedia software firm Aimtech Corp. puts a twist on the Web-based help desk concept. It recently introduced its customers to VanWeb, a Web-based front end to the customer support platform it uses from Vantive Corp. Customers with Web browsers can now access the same knowledge base that Aimtech's internal support people use to answer queries.

"We saw a way to give our customers 24-by-7 help, to find answers when we're not around," says Bill Levesque, vice president of customer service for the Nashua, N.H., company. Aimtech has seen a 20% decrease in help desk telephone calls.

A hard line

Fired up by the positive results of even limited use of Web-based help desk systems, IT managers are now concentrating on getting more users onboard.

At US WEST Communications, for example, IT managers sent out E-mail, set up a booth in the middle of the building and blanketed the employee base with voice mail to let people know about the potential benefits of using the company's Web-based help desk, says Tim White, an internal help desk manager for the carrier, located in Denver. And yet, he says, half of the people who call the help desk still don't know about the Web offering.

Now when users call for status checks, they're told to use the URL, White says.

Autodesk has adopted a similar strategy. Barthold tells callers how to bring up their browsers, how to get to the help desk and how to enter their information. Once users have used the system — and especially after they get a rapid response to a Web-based query — they are generally hooked, he says.

Autodesk plans to take a hard line. It will refuse to take anything but emergencies that affect corporate operations over the telephone, Barthold says. Through such measures, Barthold expects to boost the percentage of Web-based queries to 25% of total submissions in the next few months.

Other help desk operations have discovered that getting users on the Web is a matter of education.

Motorola Cellular Infrastructure Group's customer request center made the mistake of assuming users would automatically know how to access Remedy's ARS via the Web, says Doug Blair, team leader for that Motorola unit's IT organization. "After all, we [at IT] use the Web every day, and this is a more technically literate company than most."

As it turns out, the department had to give users a lot of guidance and training, Blair says.

Another, even tougher, problem for the help desk is getting users to exploit Web-based tools to solve their own problems rather than simply entering and checking the status of trouble tickets.

US WEST had trouble getting users to check out a Web page housing answers to their most-asked questions about everyday problems like software glitches and installation hangups, White says. To combat that problem, IT put the link to the popular trouble-ticket status checker on the same page as the most-asked questions file.

Motorola also hopes to get users to start accessing help desk resources to solve their own problems, Blair says. Next year, IT plans to implement a Web-based front end with fill-in-the-blank fields to guide users through commonly asked questions.

These capabilities come from ARS, not from the Web, Blair points out. The Web provides the friendly interface that, unlike typical help desk clients, can run on virtually any desktop.

It is the next generation of Web-based help desk platforms, however, that could really revolutionize things, says The Yankee Group's Bonde. New capabilities and features will address current limitations in key areas such as intelligent client/server interaction and security, vendors say. ⊜

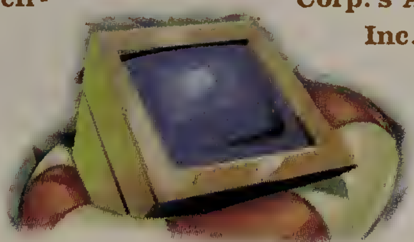
Buoyed by development promises

Help desk administrators would like help desk clients for the intranet to be as robust as their non-Web counterparts.

Help desk managers who have seen significant productivity gains from the first generation of Web help desk tools can't wait for the second round.

Today's Web-based help desk clients offer only a subset of the functions available through the clients that vendors designed specifically for their systems. Overcoming these limitations often means circumventing the limitations inherent in the Web environment itself.

Help desk vendors' efforts to overcome HTML limitations are promising.



HTML-generated Web pages are simple fill-in-the-blank forms that do not support embedded intelligence. "Web clients are more like 3270 terminals than interactive front ends," says Bill Freedman, product manager for the ARWeb help desk software at Remedy Corp.

If would be nice if ARWeb supported interactive links that would let users fill in one field, such as "user ID," hit return, and have the software automatically populate all other fields, says Tom Barthold, manager of help desk operations at Autodesk, Inc. in San Rafael, Calif. Remedy's regular Action Request System client supports this capability.

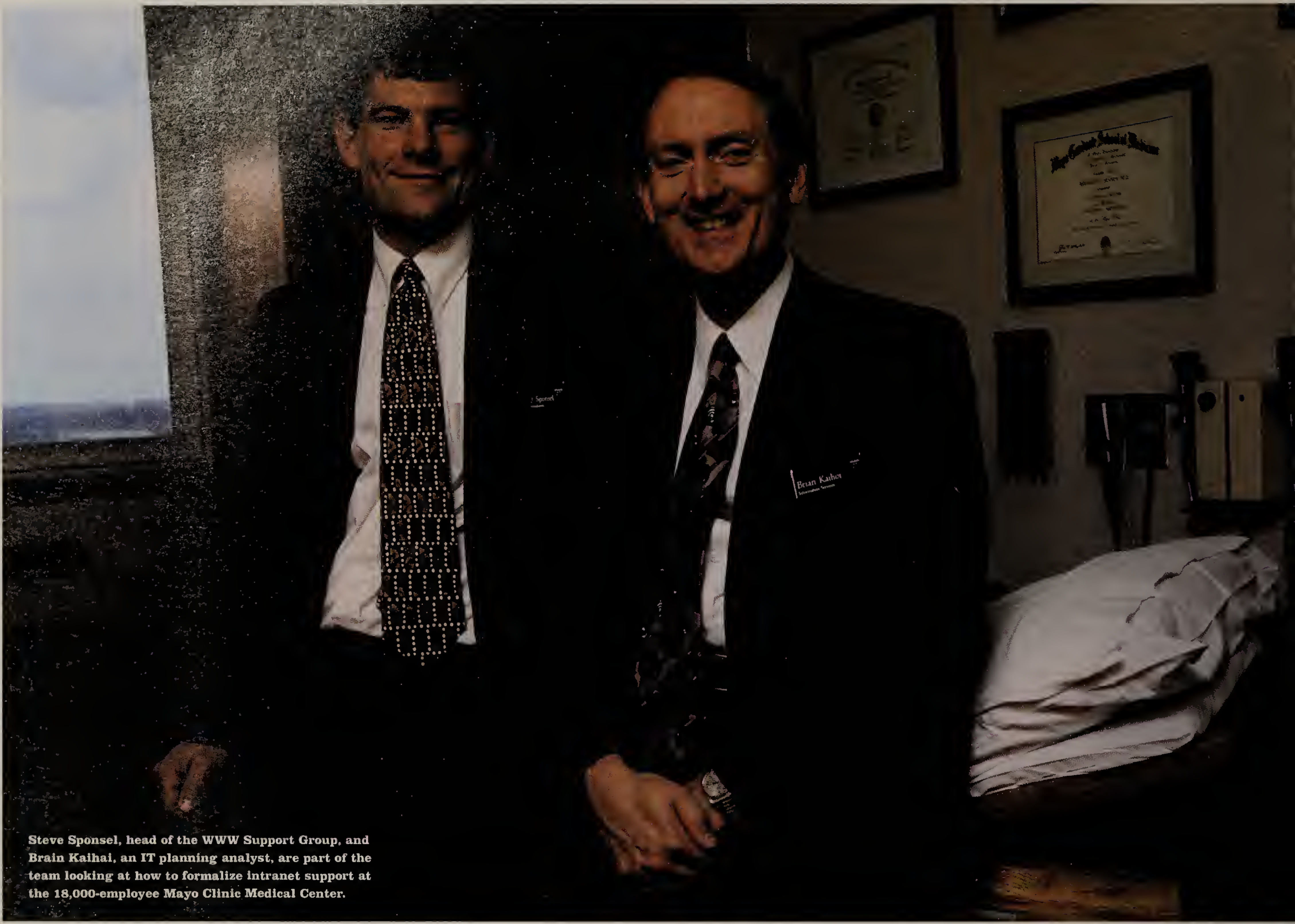
Another inherent HTML limitation prevents Web users from changing help desk records. They can't change the status of a trouble ticket from open to resolved, for example.

Leading help desk platform vendors such as Remedy and Clarify, Inc. have indicated that they plan to overcome HTML limitations by supporting Web-based programming environments such as Microsoft Corp.'s ActiveX or Sun Microsystems, Inc.'s Java.

Such support will provide Web clients with the friendly features — tabs, hierarchical pop-up buttons, menus and selectable lists — found in ordinary business applications, says Marshall Powell, Clarify's technical marketing manager.

Help desk vendors also are heavily involved in consortiums that aim to provide standardized Web access to network management platforms.

The latest effort, Web-Based Enterprise Management (WBEM), would let help desk vendors build applications that can view and massage data across umbrella management platforms, such as Microsoft's Systems Management Server and Hewlett-Packard Co.'s OpenView, according to Powell. Commercial network management platform vendors aren't expected to start rolling out commercial WBEM support until next year, however.



Steve Sponsel, head of the WWW Support Group, and Brain Kaihai, an IT planning analyst, are part of the team looking at how to formalize intranet support at the 18,000-employee Mayo Clinic Medical Center.

BY JOHN DIX

A DAY AT THE MAYO MEDICAL CENTER

The Mayo Clinic, Saint Marys Hospital and Rochester Methodist Hospital form an integrated medical center in Minnesota. A single day at the sprawling facility will involve …

Mayo Medical Center stats

Outpatients arriving	1,300
Admissions to the hospital	138
Surgical procedures	163
Lab tests	16,000
Blood tests	9,600
Radiology procedures	3,069
Electrocardiograms	550

A patient with extreme back pain has just been admitted to one of the Mayo Clinic hospitals. Nurse Riley, unsure of how best to deal with the patient's pain, needs some advice. So she heads to the nursing station, fires up the Web browser on the PC used to access patient data and logs into MayoWeb.

From the home page, she clicks on Department of Nursing, then on Patient Care Guidelines and finally on a hotlink labeled Chronic Pain.

That page is divided into Definitions, Defining Characteristics and Related Factors, which she peruses. She then taps another hotlink labeled Nursing Interventions. This brings up a large discussion about administering analgesics, which — after careful study — arms her with the information she needs to ease the patient's stay.

MayoWeb saved the nurse the time of searching through three-ring binders for the information, helped ensure she had up-to-the-minute data and, most importantly, resulted in better care for the patient.

William James Mayo would have been proud. Mayo, who in 1889 cofounded what would become the sprawling Mayo Medical Center, was fond of saying, "The best interest of the patient is the only interest to be considered."

MayoWeb is one of many intranet initiatives designed to advance patient care at the non-profit, 18,000-employee institution. At the other end of the spectrum, for example, is a private Web used by MIS professionals to help maintain the information infrastructure.

While many people associate the name Mayo with cancer research, the center's primary advantage over other institutions is that it is an integrated group practice. Doctors work in teams. That means if you make an appointment with an internist you may end up seeing a specialist in cardiovascular surgery later that day and two other specialists the next.

Most hospitals require you to make appointments for each specialist, introducing two- to three-week delays at every hop along the way and leaving you wondering if these doctors are actually communicating.

One elderly man from Michigan we talked to said he bounced from doctor to doctor for two months before packing his bags and heading

PHOTO: JIM ARNDT

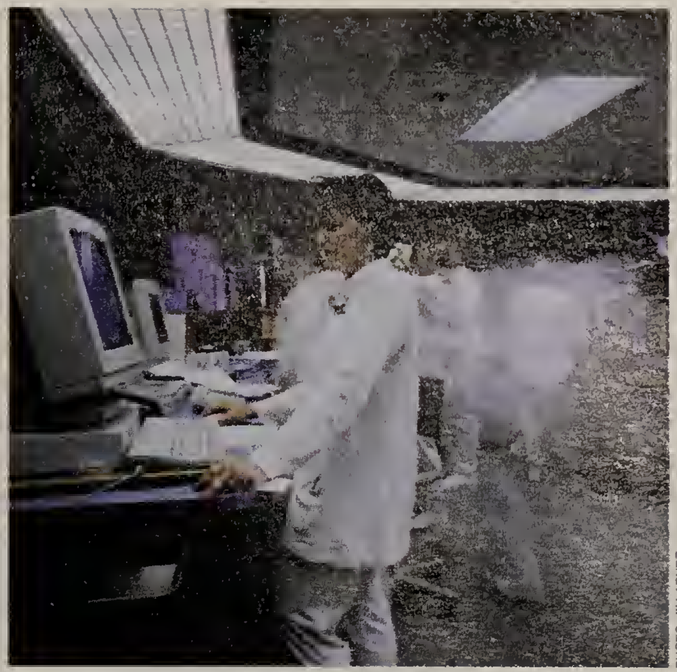


PHOTO: JIM ARNDT

With an eye toward improving patient care, the Mayo Medical Center outfits nursing stations with PCs and Web browsers. Nurses can tap into MayoWeb for up-to-date information on treatments.

Rx Net for Team Mayo

Famed institution looks to formalize intranet efforts

to Mayo in Rochester, Minn. The delay for his endocrinologist appointment alone would have been six weeks. At Mayo, he saw five doctors in four days. By the fifth day, he was heading in for a procedure.

"Patient care is the primary focus here," says Brian Kaihai, a planning analyst in Information, Architecture and Technology (IAT), an IS group. "It's a group practice in that people collaborate on patient care."

It is perhaps this team environment that has helped nourish the development of Mayo's Web initiatives: Employees familiar with the benefits of collaboration see intranets as a powerful teaming tool.

Although Mayo already is benefiting from its many private Webs, they are essentially grassroots efforts. The institution is just now reaching the point where it needs to formalize Web support to take it to the next level.

"Everything we've done so far has come from people working out of their hip pockets," Kaihai says.

The early goings

Kaihai, a 23-year Mayo veteran, has worked for the past year and a half as part of the 14-person IAT group, which essentially provides technology evaluation, data modeling and other support functions to three other IS groups. As such, Kaihai got involved with early efforts to explore Web technology.

It wasn't much of a leap, he says, because the institution already had a presence on the World-Wide Web and an IP backbone in place. In addition, the research end of the institution had been using the Internet for years to collaborate with other medical researchers.

So, with little effort and zero fanfare, late last year MayoWeb was created simply by putting up an Apache shareware Web server.

The next step was to identify potential users, so Kaihai organized a lunch and invited everyone and anyone who was dabbling with Web technology or thought it might benefit their work.

More than 100 people came. It was clear Mayo had a tiger by the tail.

In short order, that first lunch meeting morphed into a bimonthly affair attended by a range of Web authors. "We started getting a whole mix of people coming to these things," Kaihai says. "We'd have a medical secretary sitting next to a consulting physician, sitting next to a programmer, a respiratory therapist, a nurse."

People had their own ideas about how Web technology could help them do their jobs better, and many already were actively creating Web pages and configuring their personal desktops as Web servers so other people could share what they had developed.

For example, Paul Springer, a programmer analyst in the MIS Clinical Applications group, saw Web technology as an opportunity to post systems documentation and other material of general use to MIS.

See Mayo, *page 28*

A FIRST-TIME AUTHOR

One of the benefits of intranets is the potential for getting a wide range of people involved in sharing corporate information.

Take Connie Resler, a communications specialist at the Mayo Clinic. Her experience with Web publishing can be, in her words, "measured almost in minutes."

Connie Resler, a communications specialist at Mayo Clinic, entered the Web world by default. It's not so bad, she says.

PHOTO: JIM ARNDT

Resler has been asked by the Closed Circuit TV (CCTV) committee to figure out how to use the Web to list patient education programming airing on CCTV. That information is normally circulated in a brochure Resler produces.

"A nurse will say, 'I need to have Mr. Jones watch 'Food Facts of Diabetes' and will go to his room and give him this brochure,'" Resler says. "But as with most print documents, by the time you get it printed there have already been changes so that program may or may not be on."

The CCTV committee thought it would be nice if nurses could simply tap into the list online and print it as needed. That way it would always be up to date.

Since Resler owned the paper version, she inherited the job of figuring out how to do it electronically — never mind the fact she has never published any type of Web document.

Resler admits much of the Web process is still foreign to her and her teammates have done much of the work so far. But she says it doesn't seem as complicated as she thought. "I just took the existing PageMaker document and put it back into Microsoft Word and then used a [shareware] piece of software to translate it into HTML."

Will she learn HTML?

"I have this book and I'm sort of working my way through it. And there's a tutorial on the Web that our Webmaster told me about. But I don't know when it's all going to gel."

Mayo,

continued from page 27

That blossomed into a full-blown support resource. "I have documentation, naming conventions, guidelines, usability information, information on all the different products we use and pointers to news groups and home pages," Springer says.

While Springer was steeped in the technology, Web newbies needed encouragement and support that simply wasn't available given the grassroots nature of the efforts. So a support phone number was created that rang a beeper Kaihai and a small group of others took turns carrying.

"The idea was to provide one-stop shopping, to give people a central point of contact and to start logging the calls and finding the central issues, the central problems," Kaihai says.

This type of approach can only get you so far. "We hit a plateau," Kaihai says. "I think we pushed the informal a lot further than most organizations. Now the formal stuff needs to happen to get it to the next level."

The wheels are already in motion. Last April, a task force was created and charged with figuring out how Mayo could nurture its intranet efforts. Steve Sponsel, printing coordinator in the systems and procedures division, was given the reins.

The WWW Support Group soon realized it was looking at a multifaceted problem. The needs of individual Web publishers differed from workgroup users, while institutionwide Web publishing raised completely different questions.

Much of Mayo's Web activity today involves individual-oriented tasks such as the posting of announcements, projects and schedules, Sponsel says. But as you move up the chain, the impact a given Web project has on other people becomes more pronounced.

For example, Sponsel says, if a workgroup wants to put up a time-off request form, somebody in a supervisory capacity has to manage it, which is different than the "post it and leave it" needs of individuals.

If that same form is put out there for 20,000 employees, the management function is different still. "For a universally used form, somebody has to get in there and figure out what exactly is the information we need, where does it need to go, does it need any further approval, are there routing requirements? It's got to be done right the first time, or it's a disaster."

The Web, however, does away with the natural order that has helped regulate who is publishing what, Sponsel says. "In the traditional realm, if we're doing a large institutional publication, there's a body of policies we know about. And if we see things that are out of the norm, then red flags go up.

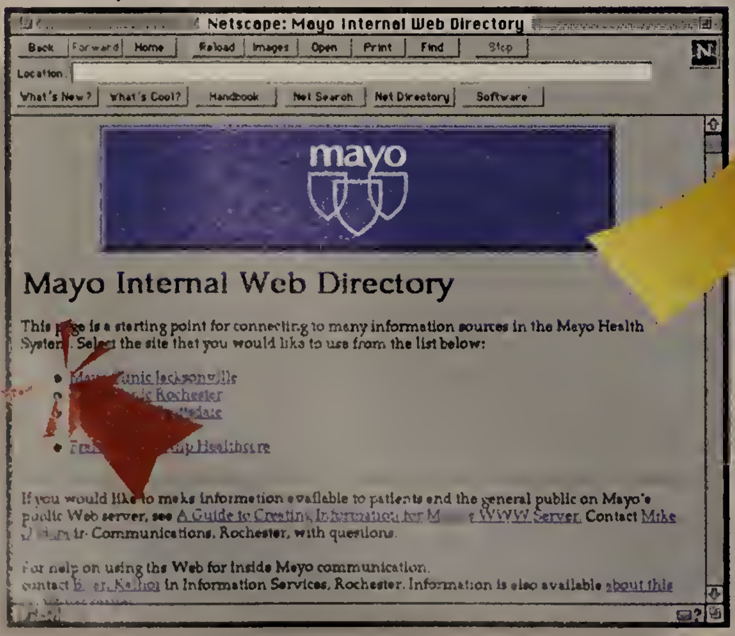
SITE SEEING

A step-by-step guide to Mayo Clinic's intranet

Medical intervention

A physician at the Mayo Clinic is seeing a new patient, who has just been diagnosed with Type II Diabetes. The physician wants to make sure he knows the exact protocol for treating the condition so he decides to check out what information is available on MayoWeb, the institution's intranet.

❶ The physician heads to his office, turns on his PC and opens his Web browser. He is taken to his default home page, the Mayo Internal Web Directory. He clicks on the hotlink to Mayo Clinic Rochester, which is where he works.



Mayo Internal Web Directory

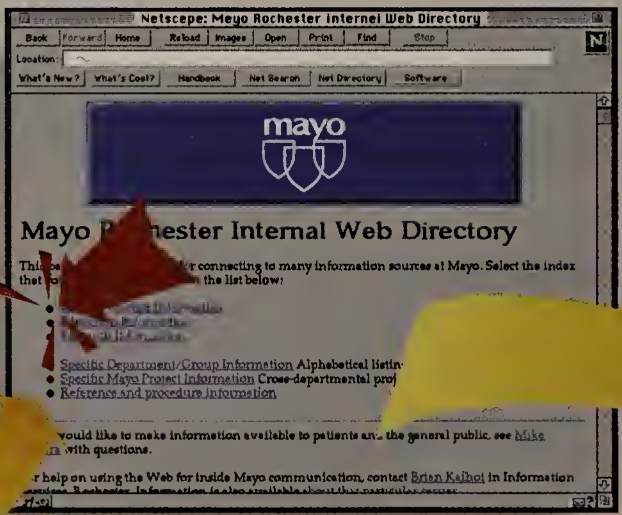
This page is a starting point for connecting to many information sources in the Mayo Health System. Select the site that you would like to use from the list below:

- [illegible] Clinic Jacksonville
- [illegible] Clinic Rochester
- [illegible]dale
- [illegible] Healthcare

If you would like to make information available to patients and the general public on Mayo's public Web server, see A Guide to Creating Information for M[illegible] WWW Server. Contact Mike [illegible] Communications, Rochester, with questions.

For help on using the Web for Inside Mayo communication, contact [illegible] in Information Services, Rochester. Information is also available about this

❷ From the Rochester directory, he clicks on the link to the Clinical Practice Information pages on MayoWeb.



Mayo R[illegible]ester Internal Web Directory

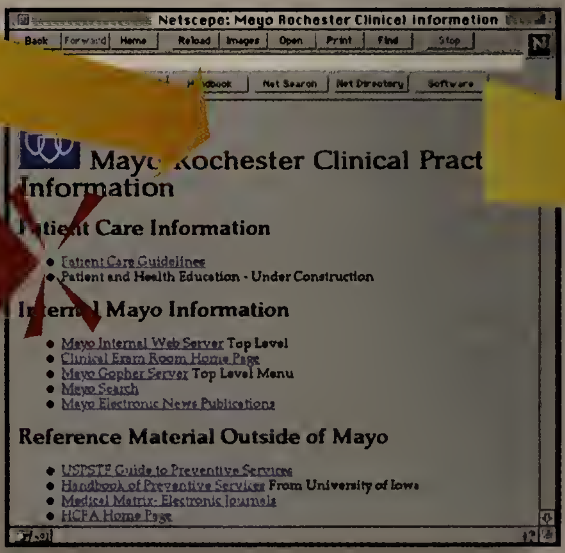
This [illegible] connecting to many information sources at Mayo. Select the index that [illegible] the list below:

- [illegible]
- [illegible]
- [illegible]
- Specific Department/Group Information Alphabetical listin[illegible]
- Specific Mayo Project Information Cross-departmental proj[illegible]
- Reference and procedure information

[illegible] would like to make information available to patients and the general public, see Mike [illegible] with questions.

[illegible]r help on using the Web for inside Mayo communication, contact Brian Kaihoi in Information

❸ Since he's looking for information on treating Type II Diabetes, he clicks on the hotlink to Patient Care Guidelines.



Mayo Rochester Clinical Pract[illegible] Information

Patient Care Information

- Patient Care Guidelines
- Patient and Health Education - Under Construction

Internal Mayo Information

- Mayo Internal Web Server Top Level
- Clinical Exam Room Home Page
- Mayo Gopher Server Top Level Menu
- Mayo Search
- Mayo Electronic News Publications

Reference Material Outside of Mayo

- USPSTF Guide to Preventive Services
- Handbook of Preventive Services From University of Iowa
- Medical Matrix- Electronic Journals
- HCFA Home Page

"With the Web, somebody can pull together a significant amount of content and hang it out there. So the question becomes, 'Can our physicians rely on that?'" Sponsel says.

"What we want to do is make it very unlikely that anybody would want to spend a weekend creating a major document when instead they can stroll down to the Web support people and say, 'I need this done,'" Sponsel says.

This essentially provides some of the control lost with the Web, without stifling creative use of the medium.

The recommendation

The support group the task force envisions would have four service modules: analysis and planning, production, publishing and support.

The analysis and planning unit would evaluate content requests. It would figure out how the project would be done and how the material maps with existing content.

The production unit would be responsible for the creative work, the programming and quality assurance. Publishing would be responsible for deployment, and the support unit would build and support the Web infrastructure, man the help desk and evangelize the whole intranet concept.

If and when this group is formed, one of the challenges it will face is helping the organization leap from the current individual and workgroup-oriented Web material that is common today, to institutionwide applications that promise bigger benefits.

It would be nice, for example, to get the quarterly Mayo directory on MayoWeb, Sponsel says. Given the institution's integrated nature, this directory serves as a key resource, but some 4,000 to 5,000 changes are made to it each quarter. While the changes are input daily, the book is only printed four times a year so the hard copy is never really up to date.

That would change on the Web. Ultimately, the hard-copy directory could be done away with, saving more than $150,000 in printing costs. But that is still a pipedream for now.

Smaller efforts, however, promise more near-term savings. Kaihai says putting the Nursing Procedure Guide up on MayoWeb, for example, would save $40,000 per year.

Even more important is the improvement in patient care.

"The problem with procedure guides and other documents is they're cumbersome and they're physically someplace where you aren't," Sponsel says. "If you can jump on the terminal and find what you need and get current information, we can't begin to put a price on that. Current information in a medical institution results in better patient care." ⊜

THE FRONT DOOR

MayoWeb is based on a Sun Microsystems Computer Corp. SPARC20 workstation running the Apache freeware Web server. But in many respects, it is simply a front door to some 50 Web servers on users' desktop systems.

The central server was installed at the end of last year as a first step toward formalizing Web publishing within the 18,000-employee institution.

"We decided we needed a place for people to do Web document publishing if they didn't want to mess with their own server," says Brian Kaihai, a planning analyst in Mayo's Information, Architecture and Technology (IAT) group.

From experience gleaned on the Internet side of the Web, Mayo decided it needed a development platform for works in progress and a production box backed up by 7x24 support.

"The production box's primary job is to serve documents, not run applications," Kaihai says.

Users interested in running Common Gateway Interfaces can maintain that material on their own servers and create links to the MayoWeb home page.

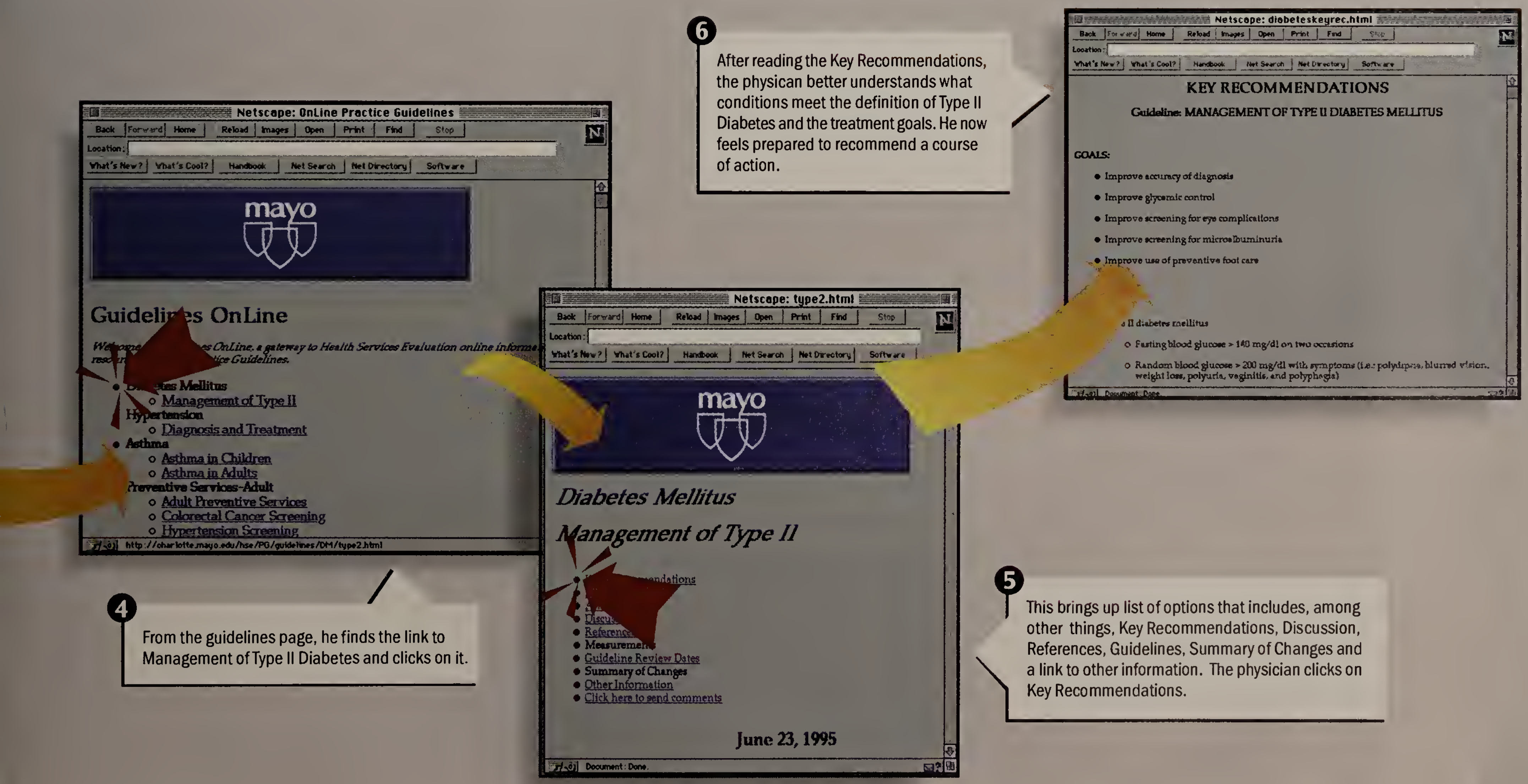
"If you have a server in your area and you want the rest of the clinic to have access to it, you make a phone call and a link gets put into the home page," Kaihai says. "If you don't want others to know it's there, you simply don't make the call."

Individuals can pick their own-poison. "We don't have a rule that says servers have to be of a particular type or on a particular platform," Kaihai says.

Nor is there an institutional mandate on what browser to use.

However, new workstations come with Netscape Communications Corp.'s Navigator, Kaihai says. "And if you ask for Web access, we will install Netscape because as an institution we get it free." He estimates that 70% of the Web desktops run Netscape.

Will the SPARC20 workstation supporting MayoWeb run out of gas any time soon? Kaihai says it is already supporting thousands of hits and isn't working too hard. "It's one of the pluses of the technology: You don't maintain the sessions off the servers."



Guideli es OnLine

We ome es OnLine, a gateway to Health Services Evaluation online informa resear tice Guidelines.

- etes Mellitus
    - Management of Type II
- Hypertension
    - Diagnosis and Treatment
- Asthma
    - Asthma in Children
    - Asthma in Adults
- Preventive Services-Adult
    - Adult Preventive Services
    - Colorectal Cancer Screening
    - Hypertension Screening

http://charlotte.mayo.edu/hse/PG/guidelines/DM/type2.html

④ From the guidelines page, he finds the link to Management of Type II Diabetes and clicks on it.

Diabetes Mellitus

Management of Type II

- endations
- Discu
- Reference
- Measureme
- Guideline Review Dates
- Summary of Changes
- Other Information
- Click here to send comments

June 23, 1995

Document: Done.

⑤ This brings up list of options that includes, among other things, Key Recommendations, Discussion, References, Guidelines, Summary of Changes and a link to other information. The physician clicks on Key Recommendations.

⑥ After reading the Key Recommendations, the physican better understands what conditions meet the definition of Type II Diabetes and the treatment goals. He now feels prepared to recommend a course of action.

KEY RECOMMENDATIONS

Guideline: MANAGEMENT OF TYPE II DIABETES MELLITUS

GOALS:

- Improve accuracy of diagnosis
- Improve glycemic control
- Improve screening for eye complications
- Improve screening for microalbuminuria
- Improve use of preventive foot care

II diabetes mellitus

- Fasting blood glucose > 140 mg/dl on two occasions
- Random blood glucose > 200 mg/dl with symptoms (i.e.: polydipsia, blurred vision, weight loss, polyuria, vaginitis, and polyphagia)

Document: Done.

GET T

Web designers and managers have ple

BY PEGGY WATT

When it comes to a toolbox, craftsmen can be mighty fussy: They want just the right hammer or that certain wrench. Intranet builders are no different, but they definitely don't have the luxury of being so particular.

Sure, as far as basic Web server software and browsers go, intranet builders can be as choosy as they please. Microsoft Corp., Netscape Communications Corp. and other vendors offer a variety of comparable, affordable products.

But when it gets to more sophisticated tools, the choices are harder to come by. Intranet managers, for example, say they'd like a range of tools that help keep track of the hyperlinks on an internal Web. The inability to track links can kill an intranet manager, says Bob Zinnel, manager of server operations for GTE Intelligence Network Services, Inc. in Dallas.

Zinnel oversees more than 100 Web servers accessed by 70,000 users worldwide, but department managers handle the content on their Web pages. When they don't properly document changes, users click on links and hit dead ends, he says.

Agents and spiders can help chart Webs and trace links to completion, but these tools aren't that practical for smaller intranets. "We just track [links] manually because we don't have a lot of them," comments Joseph Urda, advanced technology database administrator for Boeing Information Services, Inc. at Florida's Kennedy Space Center.

Zinnel, Urda and other users say they expect Microsoft to further enhance its Windows NT network operating system and Internet Information Server with link tracking and other managment tools. Zinnel says he already appreciates the capability to log in remotely from any node and access Windows NT's administrative functions, but that's not enough.

Other intranet managers agree. "When we get into library services and directory services, I'd like to hook that to the operating system's directory services," says Frank Matthewson, an engineering manager with Bechtel Corp. in Houston. "I hope Microsoft does that for us."

Following closely on Matthewson's wish list is a good document tracking and management function at the operating system level. "As we get thousands of documents out there on the HTTP servers, they'll start getting unmanageable."

Bechtel is considering merging its document management system with its internal Web, and if an adequate Web-based management tool doesn't surface soon, Matthewson will try using the version control and tracking functions of his document management system in the combined configuration.

"I think those technologies are merging anyway," Matthewson says. "An HTTP server is basically just a big file server. But it's easy to lose track of what's out there."

His observations are typical. Intranet managers repeatedly mention that the administration and management slots in their toolboxes are empty. Internet tools designed to develop sites on the World-Wide Web usually apply as easily to internal Webs, but administrative tools do not. What's more, intranets are not easily managed by LAN tools.

But a few management tools are available. Microsystems Software, Inc.'s Cyber Patrol, for example, is a tool aimed primarily at controlling site access. WebTrends from e.g. Software, Inc. monitors and controls Web site access and categorizes users.

An intranet's paintbrushes

Authoring and design tools, such as Adobe System, Inc.'s PageMill, Claris Corp.'s Home Page and Microsoft's FrontPage, are the paintbrushes of an intranet. Through them, intranet designers provide the look and feel — the texture — of their sites.

Unfortunately, most design tools need

OOLED

nty of room to fill in their toolboxes.

some fine-tuning themselves, intranet builders say. For example, Boeing's Urda notes, you can't share stylesheets between Microsoft's Internet Explorer browser and FrontPage. This is because Microsoft complies with the World Wide Web Consortium's emerging Cascaded Style Sheet standard in the browser but not in the design tool.

Web page preparation is a related issue. Existing documents are usually the first things that go up on the corporate intranet, but those documents aren't likely to already be in HTML format. Microsoft provides a family of Internet Assistants for converting Office application file formats to HTML. However, managers say they're always experimenting with conversion from other formats, including graphics and text.

This is a case in which it might be easier to build than buy.

Stanford University's Highwire Press, which publishes academic journals online, certainly thinks so. "We've done a huge amount of custom work," says Adam Elman, a developer with the organization.

Of all the original tools, Elman says he finds a template creator that relies on Common Gateway Interface scripts to generate a page dynamically to be one of the most useful. The tool converts documents from one of the publishing layout formats used by academic texts (sometimes a database format) to the Structured General Markup Language and from that to HTML.

"I haven't seen anything like our template tool in the market," Elman says. "Most of the stuff out there lets you embed code in an HTML page. We keep the HTML page separate from the code, and change the page without changing the code."

It seems when Stanford isn't developing its own tool it's using public domain Unix utilities, which are easy to fit into an academic computing environment, Elman says.

But not all the good stuff in the public domain is on Unix, notes Ron Williams, a programmer at Chevron Corp. in San Ramon, Calif. His favorite graphics editor is a public domain Windows program called Gif Construction Set, from Alchemy Mindworks, Inc. "It's great for doing little animated GIFs on a Web page."

Also available in the graphics category are some mature commercial products. Williams and other intranet managers mention Alchemy's product because it is tailored for Web graphics-handling. Also cited are Quarterdeck Corp.'s Hijaak graphics editing and conversion suite and Adobe's broad selection of graphics editing tools that now accommodate common Web formats.

For those intranet managers who want to reach out and touch the HTML themselves, direct access and more sophisticated editing functions are available from several page design programs. One of the first such design tools is SoftQuad, Inc.'s HoTMetal Pro, the latest release of which supports Sun Microsystems, Inc.'s Java.

Those taking an opposite approach have stocked the HTML-avoiding WebSuite from Digital Style Corp. Templates provide a starting point for Web design.

More than one medium

Multimedia development is becoming one of the fastest growing intranet projects, particularly as companies evaluate how to bring employee training to their Webs.

"People wanted video training material delivered over the LAN, but video is difficult to deliver that way. With an intranet, it's feasible," says Jay Moss, a member of the Chevron Multimedia Center in San Francisco.

When the Chevron Multimedia Center's prototype intranet goes live in October, the developers expect it to be a delivery mechanism for the company's training projects. They'll use the multimedia development environment from Macromedia, Inc. Adding animation, audio and other interactive elements makes pages "much more engaging," Moss says. ≡

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Hindsight being as accurate as it is, we thought it would be interesting to give a handful of intranet pioneers that rare opportunity: the chance to daydream about going back and doing it all over again.

In some cases, decisions were made out of necessity: Windows NT wasn't available so Unix had to do. But time and experience bring perspective, and all of our participants offered that things could have been different, perhaps better. Here's what they said when contributing editor Paul Korzeniowski asked: "If you could do it again, what would you do differently?"

If I could do it again...

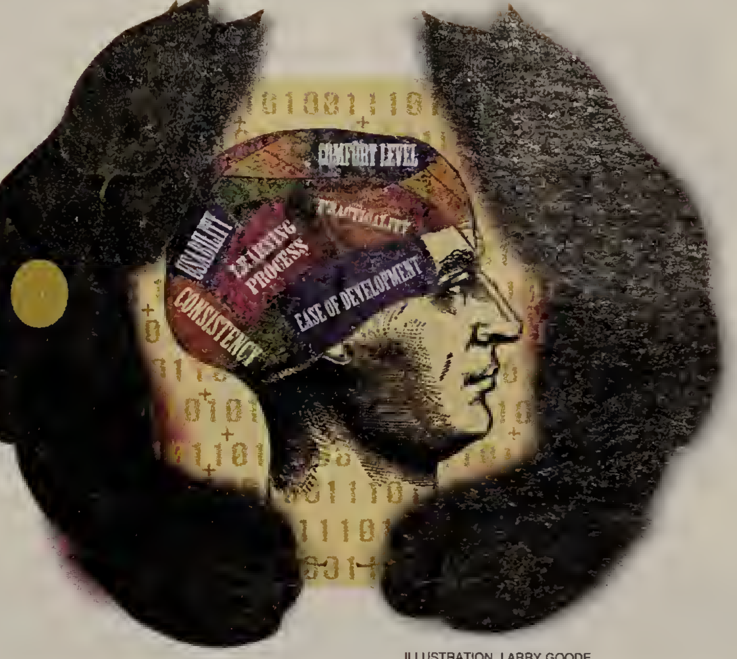

ILLUSTRATION LARRY GOODE

Five intranet managers dissect the intranet choices they have made and reflect on what they would do differently given the chance.

BOB McNEAL
Director of special projects
Time Warner, Inc.
New York

PHOTO: DANUTA OFTINOWSKI

"I'd put usability before appearances."

"We put too much emphasis on the aesthetic parts of our Web pages and not enough on their practical nature. The pages are graphically appealing but do not offer people as much information as they desire. If users hotlink from one page to a second, they often receive only a tad more information. Obtaining all the data desired can mean sifting through a handful of Web pages.

"We now know that users are more interested in getting information fast than in having the information presented in an appealing manner.

"The design also is not practical for traveling employees or those working at home. Because the pages are graphically intense, downloading one over a 9.6K or 14.4K bit/sec modem could take awhile. The aesthetics have hindered usability.

"We change color codes as users move from one page to a second and that has confused users. They expect more consistency among different pages."

KENNETH ADAMS
President
InterFusion, Inc.
Cherry Hill, N.J.

PHOTO: EUGENE MOPSIK

"I would opt for more sophisticated development tools."

"If we could do it over, we would take a closer look at the development tools used to build our intranet applications. Like other companies, we began by relying on HTML but found we needed better tools. We now understand that there are three levels of tools that can make development simpler and that the third-tier products are what we needed.

"First-level tools offer programmers a WYSIWYG editor that eliminates the need for manual HTML coding. In this case, a programmer does not have to tinker with an HTML program and can build an application by entering information on a series of templates.

"Next, there are tools that help a programmer organize a server's Web pages. These products graphically illustrate relationships between different pages so a programmer can examine them. Without this capability, a programmer often has to sift through printed documents or jump from one screen to another to determine how pages are linked.

"Third-level tools integrate Web page development in a complete programming environment. In this case, Web applications can be connected to established services, such as a security or directory system.

"Most vendors offer separate tools for each level, so programmers often have to work with multiple packages that may not be integrated. In a few cases, like with Lotus Development Corp.'s Notes, the features are available in one programming environment."

CRAIG MOORE
Portfolio administrator
Stanford University
Palo Alto, Calif.

PHOTO: CINDY CHARLES

"I'd skip custom software development."

"When we moved into this area in 1992, no commercial software was available — not even a browser. So we designed a browser based on the Gopher interface and built our first server from scratch. Those tasks added months to the development. It would have been easier to base our applications on commercial products.

"Additionally, if we could have done things differently, we would have taken

See **Do over**, *page 34*

DO OVER, *continued from page 33*

advantage of the Web's dynamic nature and designed applications that were more interactive. Our first applications were simple text-based documents that did not work with hotlinks or support HTML. Initially, those limitations were not significant because the documents were items that really do not change. Moving forward, we go with Web technology."

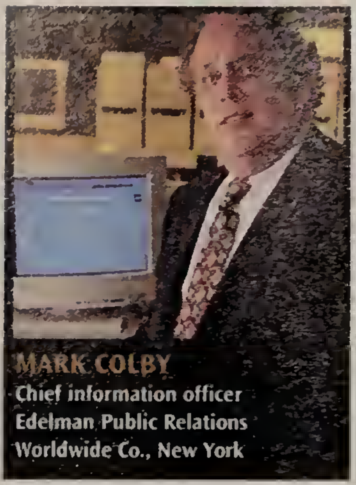
MARK COLBY
Chief information officer
Edelman Public Relations
Worldwide Co., New York

PHOTO DANUTA OFTINOWKI

"I'd go with Windows NT and bypass front-end development tools."

"Initially, we rented space from an ISP to run our intranet applications. The Internet was new, and we wanted to be sure that we could support it. Eventually, we brought the Web server in-house so it could run as a node on our network and we could control its development. By bringing the system in-house, we have been able to leverage our internal skills in running our own network to help ensure that the Web servers are always available to users.

"We started by building our intranet applications on Unix servers; we did not think that Windows NT was stable enough to consider. But now we like NT's encryption and security features and find the system easy to manage. So, we have begun moving our applications from Unix to NT. We don't consider the Unix development a total waste. We ported many internally developed Unix Web pages to NT.

"We expect our use of the Internet to grow substantially. We are a relatively small company, with 30 offices worldwide generating approximately $100 million in revenue. We have been relying on Lotus' cc:Mail to support our internal communications. We cannot afford to install big communications pipes to build complex client/server applications linking all of our offices with a product like Notes. But we might be able to build those applications on Web servers and use the Internet for communications. So, going forward, we may base more development on the Web.

"We view Windows NT as the best platform for this development, but we now have 30 Novell, Inc. NetWare servers stationed in our offices. Moving to NT would cost $50 per workstation, which comes out to $60,000. Plus, we would have to train our technicians and users to work with the new LAN operating system. We are not sure if we will make that change but are considering it strongly.

"Separately, we probably shouldn't have bothered with front-end development tools. We really haven't had much success using them. A few programmers have worked with Microsoft's FrontPage, but in most cases, they prefer to bypass the tool and develop their own routines.

FONZ ALLEN
Director of information technology
American Engineering Association
Santa Clara, Calif.

"I would nix Unix and go with Windows NT."

"Anyone planning to deploy their first intranet server should realize it will take more time and cost more money than anticipated. There is a significant learning curve to get the system operating.

"When we started, we had no Internet experience at all. So, we relied on one of our member companies, BBN Planet, for help deploying our intranet server. BBN had a great deal of experience with Unix systems, so our applications initially ran on that type of server.

"But we encountered maintenance problems. Our computer expertise was more with Windows NT; we knew little about Unix. Whenever a problem arose, we really did not know how to fix it. Rather than continue to support two different servers, we ported our applications [which run under Lotus Notes] from the Unix system to Windows NT." ⊜

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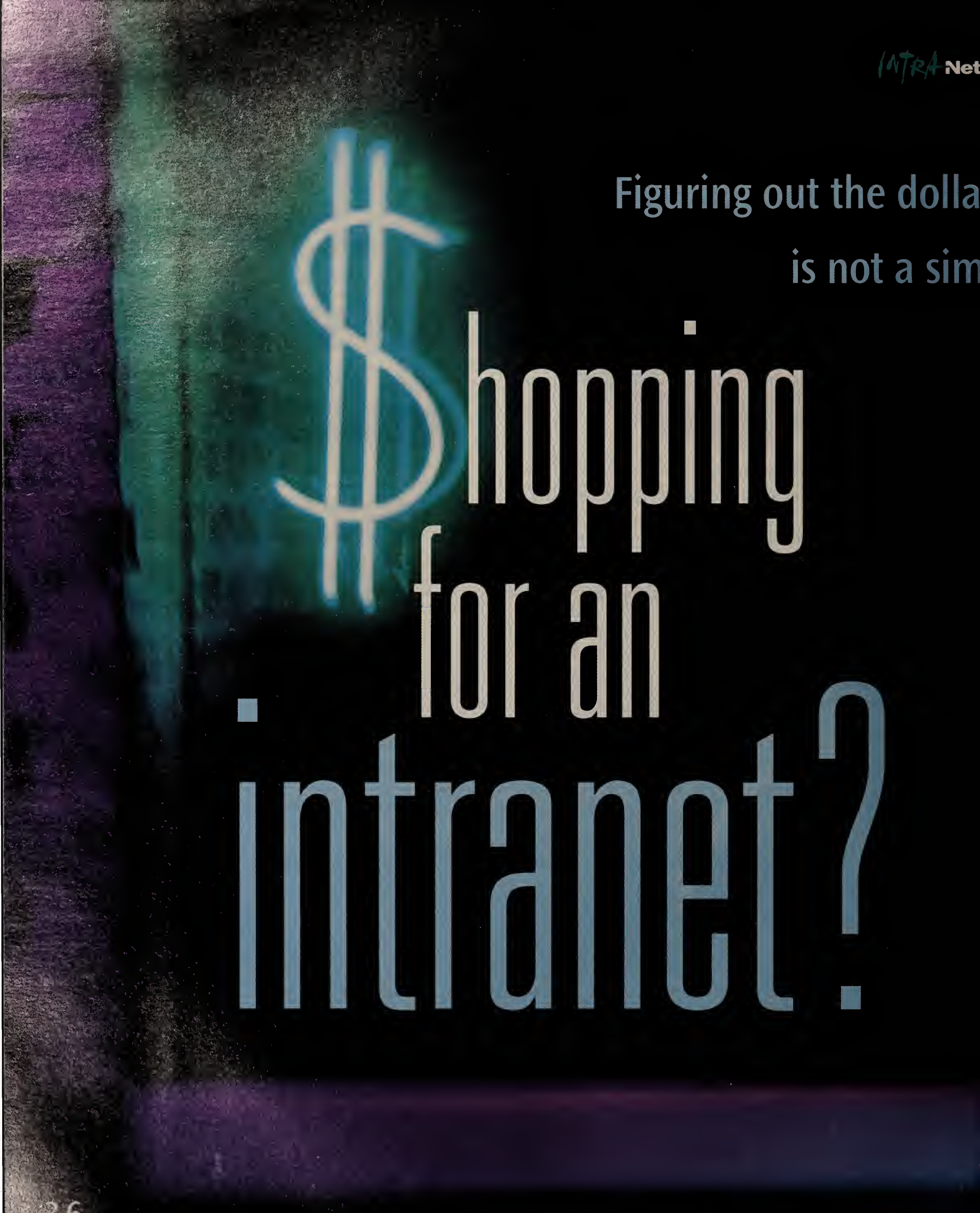


$hopping for an intranet?

and cents of an intranet
e proposition.

BY BETH SCHULTZ

It's hard to resist the urge to put up an intranet, what with the low cost of entry and the enticement of a universal user interface. So what the hey: Throw up a pilot intranet and have fun. Just make sure you're not caught by surprise; there's more to this than just window dressing.

Put the corporate telephone directory online, post the quarterly earnings, throw in a list of local eateries OK for business lunches. Before you know it, you'll have attracted a crowd.

And once that happens, things begin to change. Mission-critical data starts to amass. Web-specific applications are launched. Department users start clamoring for more Web-accessible information. Suddenly a call comes for authoring advice and support. And the server needs to be up around the clock.

In short, the Web becomes strategic. It is no longer a cheap, friendly little intranet. This thing means business.

The grim reality sets in: A private Web might be good and fun and ultimately save the company money, but it's going to cost you. You'll need to budget for heavy-duty application development tools, sophisticated security mechanisms, infrastructure upgrades, Web programmers and goodness knows what else.

Acquisition costs, of course, are relatively easy to figure. You identify what tools you need: Web-specific hardware, such as servers and peripherals; communications hardware, such as routers; leased lines, Internet access and other connectivity options; and software, including operating systems, servers, add-ons, database management, utilities and graphics packages. Then you get a bunch of price lists, calculate the licensing fees, and you can rough out the dollar figures.

But that's just for starters. What about the costs of creating and updating content, designing Web presentations, building hyperlinks and checking duplication? This is a tinkerer's technology, which means it's going to eat up the time, effort and paychecks of staffers, says Ray Laraquente, a senior research analyst at Gartner Group, Inc., a consulting firm in Stamford, Conn.

The spirit of goodwill and volunteerism that pervades a pilot intranet project can fade real quick as Web work eats up more and more of an employee's time. "People come to the sudden realization that they're spending two-thirds of their time on this and they say, 'I want a job title change and the salary, or I want out,' " Laraquente says.

The human condition

So the cost in the intranet comes not in the technology but, to a large extent, in the people power, Laraquente says.

Intranet planners agree. They've learned that the cost lies not in price of the hardware or software, but in the cost of the employees needed to develop and administrate it — the soft costs.

Those costs, the ones that can't be readily quantified, are what makes figuring out the dollars and cents of an intranet so darn difficult. "No one actually knows how much time is spent tweaking pages and generally fiddling around. It's the minutia of having to measure where all the different tributaries of costs are that people haven't been able to get their hands around," Laraquente says.

Rob Rowe, executive vice president at B.R. Blackmarr & Associates (BRBA), a Dallas-based firm that helps companies determine the costs and the return on investment (ROI) associated with intranets, agrees. "This is Wal-Mart technology, so it's not a technology issue. It's a business planning issue," he says.

IT managers should look to spend more than they expect on managing and administer-

See Cost, *page 38*

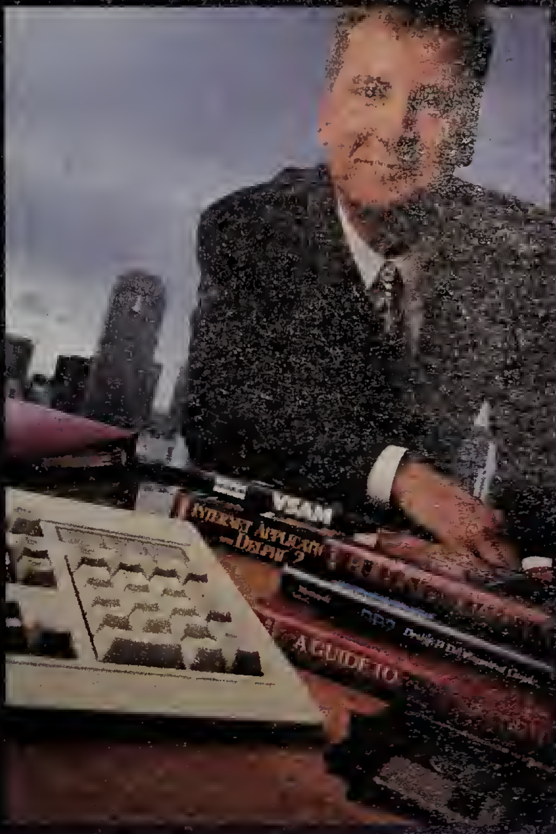


PHOTO: DAN BRYANT

Fortune 100 companies must think in terms of millions of dollars in costs for building and supporting an enterprisewide intranet, says Rob Rowe, executive vice presidnet at B.R. Blackmarr & Associates.

PHOTO: NEAL FARRIS

Cost, *continued from page 37*

ing the site, applications and plug-ins; in developing applications and integrating them with legacy systems and databases; on learning new technology, since Web products are on a rapid turnover cycle; and on content management, Laraquente suggests.

But just how much can a company expect to spend? That depends, of course, on what your goals are. One intranet engineer determined that it would cost his company roughly $20,000 for the browser licenses, Web server software and hardware needed to support an intranet for 400 to 500 people. Based on a survey of Webmasters, International Data Corp., a market research firm in Framingham, Mass., estimates the average cost per intranet site at $25,375.

That's peanuts for bigger companies, Rowe warns.

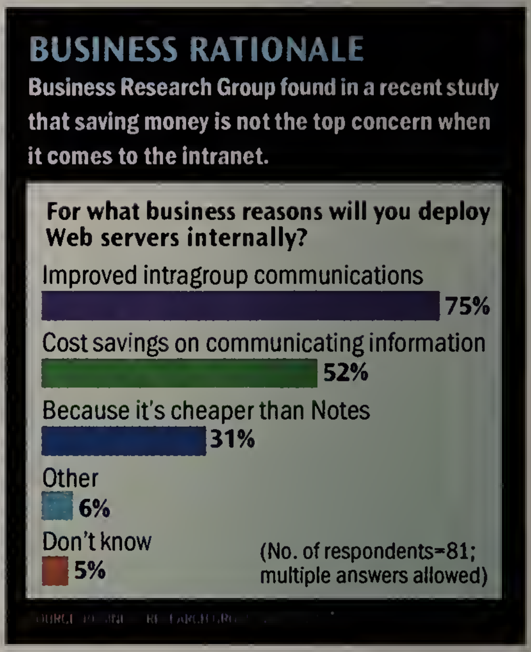
Serious money

"If a corporate-scale intranet is your business goal, you've got to be prepared to ask your company to come up with some real dough," Rowe says. "And don't underestimate the task of figuring out how much; you'll get clobbered if you do."

Companies that make the Fortune 100 list need to be thinking in terms of millions of dollars in costs for building and supporting an enterprisewide intranet that provides value to its users, Rowe asserts. "If you're fair with your management, you'll maybe find $10 million in costs."

But don't be afraid, Rowe quickly adds, because you can find tens of millions of dollars in savings, too. "You're making big changes to big things. You have to look for big numbers."

If this sounds like a massive commitment, it ought to, Rowe says. "I'm asking for a reexamination of business processes, at each department."



BUSINESS RATIONALE

Business Research Group found in a recent study that saving money is not the top concern when it comes to the intranet.

Critically important to those determining costs, Rowe says, is getting the business leaders involved. Start out by talking to the department managers, get an understanding of their applications needs and find out what they have in mind in terms of the intranet.

"Then make sure you loop back to the business people. They'll bring you the numbers. They want this more than you do," Rowe says.

Joyce Becknell, senior industry analyst for client/server research at Business Research Group, a market research firm in Newton, Mass., also thinks companies need to carefully examine business processes before they launch intranet developments. "They should take each process and say, 'What's the most efficient way to communicate this information out to the company in a quick and effective way?' "

Intranets provide incredible usefulness for a great price, but not if there's no business rationale, Becknell says. "Don't do it just because a private Web is the latest techno-toy."

See Cost, *page 40*

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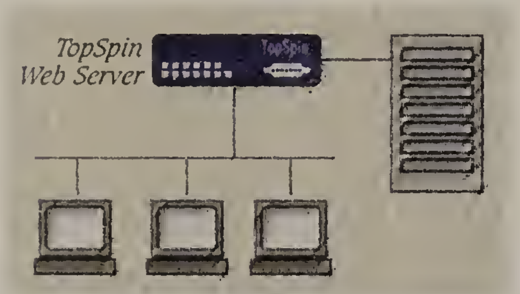

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Cost, *continued from page 38*

And if companies put up the cash to build a full-scale intranet, they better make sure they've prescribed an organizational structure that will support the ongoing commitment an intranet requires, Rowe says.

"If you don't commit, then the content becomes old, loses its value and everybody reverts back to paper-based systems. In other words, you spend a whole lot of money on nothing," Rowe adds.

Companies will undoubtedly incur costs staffing up to handle the intranet. MIS departments alone will need to hire Web programmers, technical personnel with Internet specialities and people with business know-how, Rowe recommends.

One Web consultant compares jumping on the intranet kick to taking a trip to DisneyLand. "The cost of building and maintaining the intranet is just the price of admission. If you think you've spent all the money you're going to spend when you buy the passbook, you're in for a big surprise," says Shel Holtz, principal of Holtz Communication + Technology, a consulting firm in the San Franscisco Bay area.

As the intranet buildup progresses, up spring all sorts of hidden costs, such as those for the additional personnel Rowe advocates hiring. Intranets, especially as they advance from the department to enterprise level, comprise far more than Web servers, browsers and HTML authoring tools.

It's a no-brainer to mount staff handbooks, telephone directories, office notices and other administrative documentation on the intranet, then slap the costs you've saved printing and distributing those manuals and updates on the finance VP's desk and point to the wonders of the intranet. But that's only part of the story.

Just the Facts

FAILED PROMISES

Market research firm Gartner Group, Inc. estimates that through 1998, more than 60% of intranet deployments will fail to deliver on the promise made in their supporting business cases.

"It's much more difficult to calculate what we believe are the quite significant costs of staff filing, updating and referring to paper-based material," says Bill Oldroyd, head of IS planning, design and quality at The British Library in London.

Then, if these savings can be identified and attributed to the intranet, you're faced with the even more challenging task of turning multiple small savings into a real cash benefit, Oldroyd says. "Perhaps it's best not to bother with such detail," he muses.

That would be nice, but this is the real world. And while many IT managers haven't needed to do any real number-crunching yet, that luxury won't last too much longer.

Budget demands

As companies move to more enterprisewide and interdepartmental intranets later this year and through 1997, they'll have to start justifying deployment on a financial basis, says Don Ryan, director of consulting at META Group, Inc., another market research firm in Stamford. The only way to do that is by closely examining the requirements for content and publishing, transaction-processing, access to legacy systems and groupware, he adds.

"The issue becomes fitting the intranet into the overall infrastructure. People haven't thought about this yet,

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but they are going to have to. And those users who are going to deploy intranets on a wide-scale basis better start thinking about it now," Ryan says.

BRBA's Rowe agrees. "This is about putting in the technology, supporting it and figuring out how to live in this new world."

Some IT managers are girding themselves for that effort. Most don't relish the idea.

Determining how to turn your administrative department and its users from a paper-based system to an intranet-based system is a difficult assignment. The costs are mainly human ones in terms of training and reorganization. We are only starting to scratch the surface in this area," says Oldroyd of The British Library, which has had an intranet for about one year.

The Webmaster at Amkor Electronics in West Chester, Pa., says he's certain an intranet will save the company money but he still hasn't figured out how to determine other — i.e., soft — costs.

Rob Bilson, the Webmaster, says he knows Amkor will save printing and distribution dollars, and — due to improved productivity — on labor, too. The cost for software development also will come down, thanks to the universal nature of the Web browser, he says. "We don't need to spend thousands or hundreds of thousands of dollars to have software developed to access our legacy systems when there are simple applications available that make this possible through our intranet."

But Bilson, who was hired for the purpose of managing Amkor's Internet presence and developing the intranet, says he's still working on the math for ROI, cost savings and other productivity data.

Some cost benefits of the Amkor and other intranets will be nearly impossible to calculate. What if, by being able to download product information off the intranet at 10 p.m., a salesperson can clinch a contract early the next morning? And what if the product that person is selling is actually on the market months ahead of schedule because engineering teams, collaborating over the intranet, were able to drastically scale back development time?

These are the intangibles, the non-quantifiables that make it such a difficult task to determine the financial return of an intranet. "These are things you can articulate, but not put on a balance sheet," Holtz says.

Amkor's Bilkor has only this advice: "Plan ahead, and do not be conservative in your estimates. Try to build yourself a buffer for unforeseen costs that could conceivably pop up. The market is extremely volatile right now."

Others agree. People are starting to do their capital budgets for 1997 and intranets are going to come up as a line item, Laraquente says. "The CFO is going to ask, 'What am I getting out of what you've done so far?' The intranet is going to get scrutinized."

But Rowe stresses: "Make sure your executives understand that this is not about saving money. It's about laying the roads and the bridges that will be used for years to accomplish business goals." ⊜

LURKING COSTS

Intranet advisors urge IS managers not to be conservative in their estimates for spending in these areas, which often harbor hidden costs:

- Managing and administering the site, applications and add-on products.
- Developing applications.
- Integrating intranet applications with legacy systems and databases.
- Keeping Web content fresh, accurate and secure.

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INTRAVIEW

Q&A

Management maneuvers

Amdahl Corp., still often associated with big iron, has shown considerable nimbleness in moving into the intranet arena. Amdahl's intranet involvement dates to 1994, when it began using the term "intranet" in a series of customer focus groups. The word was so new and different that Amdahl even thought about trademarking it. But alas, it didn't, and now any company even remotely related to the networking business has latched onto it. But these companies can't boast, as Amdahl can, that they've been running internal Web sites since the first browser went into beta.

Steven Telleen, director of Amdahl's IntraNet Solutions Group in Sunnyvale, Calif., gives his pioneer's perspective on intranet management in an interview with Executive Editor Beth Schultz.

Steven Telleen, director of Amdahl Corp.'s IntraNet Solutions Group

A lot of people probably still think of Amdahl Corp. first and foremost as a mainframe provider. The company has clearly been trying to change that image. How will your move into the intranet arena help?

Our traditional strengths as a company have always been based on our ability to deliver world-class service in support of enteprisewide, business-critical problems. Our products have always had to integrate with those of our competitors and others to solve our customers' problems.

Amdahl also has a long history of helping our customers bridge between legacy and emerging technologies, whether it was MVS and Unix, mainframes and client/server, or now tying it all together with an intranet infrastructure.

It was from this heritage that we approached Internet/Web technology in 1993. And it was this heritage that brought us to focus so quickly on both the intra-enterprise uses of the technology and the issues of how companies would actually implement and manage this technology as an enterprisewide infrastructure.

Recognizing that our customers viewed our service as a major value and differentiating feature, Amdahl executives began to focus on the services aspect of our business a few years ago. They set a goal to have half our revenues come from services, and this year, it looks as though they will.

Does Amdahl's IntraNet Solutions Group distinguish itself among all the Web services providers out there?

The IntraNet Solutions Group began with a focus on the organizational and management issues that need to be addressed when implementing an intranet. This focus has led us down a different path from other services that start with a focus on the technical issues of implementing an intranet.

The technical issues — the tools and standards — are an evolutionary change from what we had before. The effect of the technology on organizations is revolutionary. We have focused on how to manage that revolutionary transition.

We developed an organizational architecture and a complementary information management architecture that supports a distributed decision-making, self-publishing, user-pull model for enterprise information. We then developed a methodology for introducing these architectures into an enterprise.

We have packaged the methodology into four components: Executive Awareness, Goals Clarification, Implementation Planning and Implementation. The latter two require three distinct focuses: organizational, technical and content. The real differentiating feature of our offering is the organizational focus, which is the methodology for creating and rolling out the roles, organizations and skills required to realize the business potential of this technology.

Discuss how Amdahl itself got into Web technology and building its own intranet.

In April 1993, a few of the technical experts in Amdahl's Open Enterprise Systems (OES) organization acquired a copy of the Mosaic browser beta release and began playing with it. They hooked up with the open systems competitive analyst, who had a volume problem making information available to our field sales organization. This resulted in a skunkworks pilot project focused on a prob-

The first management issues are learning to clarify intranet business goals and putting appropriate measurements in place.

lem inside our firewall.

The IntraNet Solutions Group grew out of the Strategic and Market Planning part of OES. In mid-1994, we began looking at how Amdahl might integrate the skunkworks pilot into our business. The most striking feature of Web technology was how easy it was for nontechnical people to use. And the development trend in that direction was picking up a velocity that was hard to miss. From this observation, we concluded that the technology was not going to be the difficult challenge; the challenge for both us and our customers was going to be how to manage the result.

We developed the basic models and management architecture, then set out to implement the infrastructure inside Amdahl. We convinced the CIO to sponsor the project and used the formation of a management-based Web council as the core of our rollout. Over the next several months we learned a lot about what did and didn't work, and what was critical. We also learned something about the stages an intranet goes through during its development. The results were refined into our IntraNet Methodology.

You've created a publishing model for the intranet. Describe it and explain why you think companies should follow it.

The publishing model was created as a way to use the intranet to manage the intranet content. It is a combination of explicitly defined functions, roles and concepts, and a logical architecture and set of processes that take advantage of the strengths of intranet technology. The model allows local organizations to self-publish and manage the information for which they are responsible and, at the same time, provides an easily maintained structure that allows all the official information to be found and browsed, in a logical context. At its core is a set of broker pages for executives and managers to help them monitor the information for which they are responsible. If this type of flexibility, local control and management support is important to the company, then this model will help.

So you've come up with this idea of a broker page. What is this?

It wasn't so much the idea of a broker page as recognizing that Web pages had different purposes and met different needs. Today, I would describe these as the need for content and the need for context. As the volume of information content grows, users have an increasing need to have it presented in a relevant context. This is what a broker page does. It provides context for the user.

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A broker page should have a definite audience and purpose in mind. In a Web environment, making context information independent of content pages provides the greatest simplicity of management and flexibility of use.

Search engines are automated brokers. They are an important part of any large intranet. However, it is important to recognize that they are a general broker that provides little or no specific context up front. Users may need contextual help to formulate the right question, they may need support in following a certain sequence of activities, or they may need help screening information or identifying the official or sanctioned information sources. A search engine is not the appropriate broker for these situations.

What type of information do you suggest companies put on their intranet?

An intranet is an enabling infrastructure, and one of the things it enables is the ability of those closest to an activity to develop and control the information and activities that best support their needs. It also is important to recognize that the infrastructure will support three generic types of information: official, departmental/project and personal. All three are useful and provide value to the enterprise.

Our methodology is designed to teach organizations how to use the infrastructure and to create situations that stimulate creative thinking. But each organization in the company should be enabled to decide which information and projects make the most sense for them. The measure of a successful intranet is how well it enables these organizations to create their processes and publish their information themselves, without an MIS development project or heavy-duty technical person.

The MIS goal in the intranet development project should be to add tools and functionality that continually expand the capabilities that users can do for themselves. It should not be to identify more projects to do for them. This is the paradigm or perspective shift that MIS groups need to make.

What do you recommend for companies starting an intranet from scratch?

Start with the business goals and drive the implementation from the perspective of the management infrastructure. When you know what you are trying to accomplish and who is responsible for publishing, the technical infrastructure requirements become quite obvious. Wherever possible, stick to open standards. If you don't, you are asking for complexity and costs in the future.

On security, my suggestion is: Don't be too anxious to slap sophisticated access controls on the intranet. When the time comes, follow the enabling principle. Set up a system that allows the publishers to define who gets access to specific information themselves, but handle the authentication and certification of the user globally in the infrastructure.

Beyond the base technical intrastructure, the creative challenge is to continue improving the tools to make the users more self-supporting.

The other major challenge is providing intranet-based workgroup capabilities. This includes E-mail, conferencing, shared calendaring and workflow management. The challenge here is that integrated, intranet-based tools are just starting to emerge. The proprietary vendors already are lined up with intranet front ends to their proprietary back ends. Whether the market will tolerate these lightly masked proprietary solutions or find enough advantage in the more open and innovative emerging solutions remains to be seen.

Many intranets spring up at a grass-roots level, then get handed over or are absorbed under the corporate IT department. Some companies aren't sure how to handle this transition. Do you have any suggestions?

When this happens, it is almost certain that a management infrastructure does not exist, and this is not an IT problem; it is a business management problem. The sooner the CIO can be made aware of this, the better for everyone. The technical infrastructure — that is, the responsibility of IT— is going to look like the client/server world IT already manages. In fact, the chances are reasonably good that it already is managing much of the intranet technical infrastructure.

Once the management infrastructure has been off-loaded to the business managers, the IT department should take on the goal of enabling users to do for themselves. This means acquiring the software and making it available both for departmental servers and on servers that are managed by the IT department. Not surprisingly, when the IT department starts to offer servers that are backed up, supported and that allow the users to easily manage their own information themselves, the official information finds its own way from the departmental servers to these IT servers. The departmental servers continue to support departmental, project and personal information.

How do you think the early intranets we are seeing today will change?

The biggest change we will see is in what constitutes an intranet. Two years ago, it was clear-cut. An intranet was a Web behind a firewall. In the past two years the definition has changed in two directions. Advances in network security have made firewalls increasingly virtual. That is, information and access can be protected on physically shared networks. And there are more inter-enterprise demands for protected networks — that is, EDI applications are coming to the intranet.

I now look at intranets as protected Webs. I think this will continue to evolve to the point that each individual in an enterprise may have a slightly different intranet depending on the projects, partners and industry groups with whom they interact. ≡

> The MIS goal should be to add tools and functionality that continually expand the capabilities that users can do for themselves.

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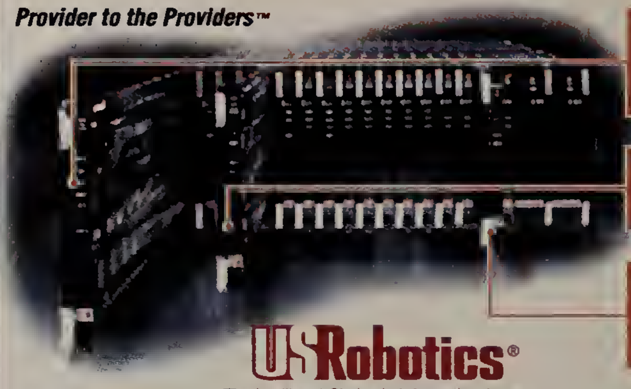

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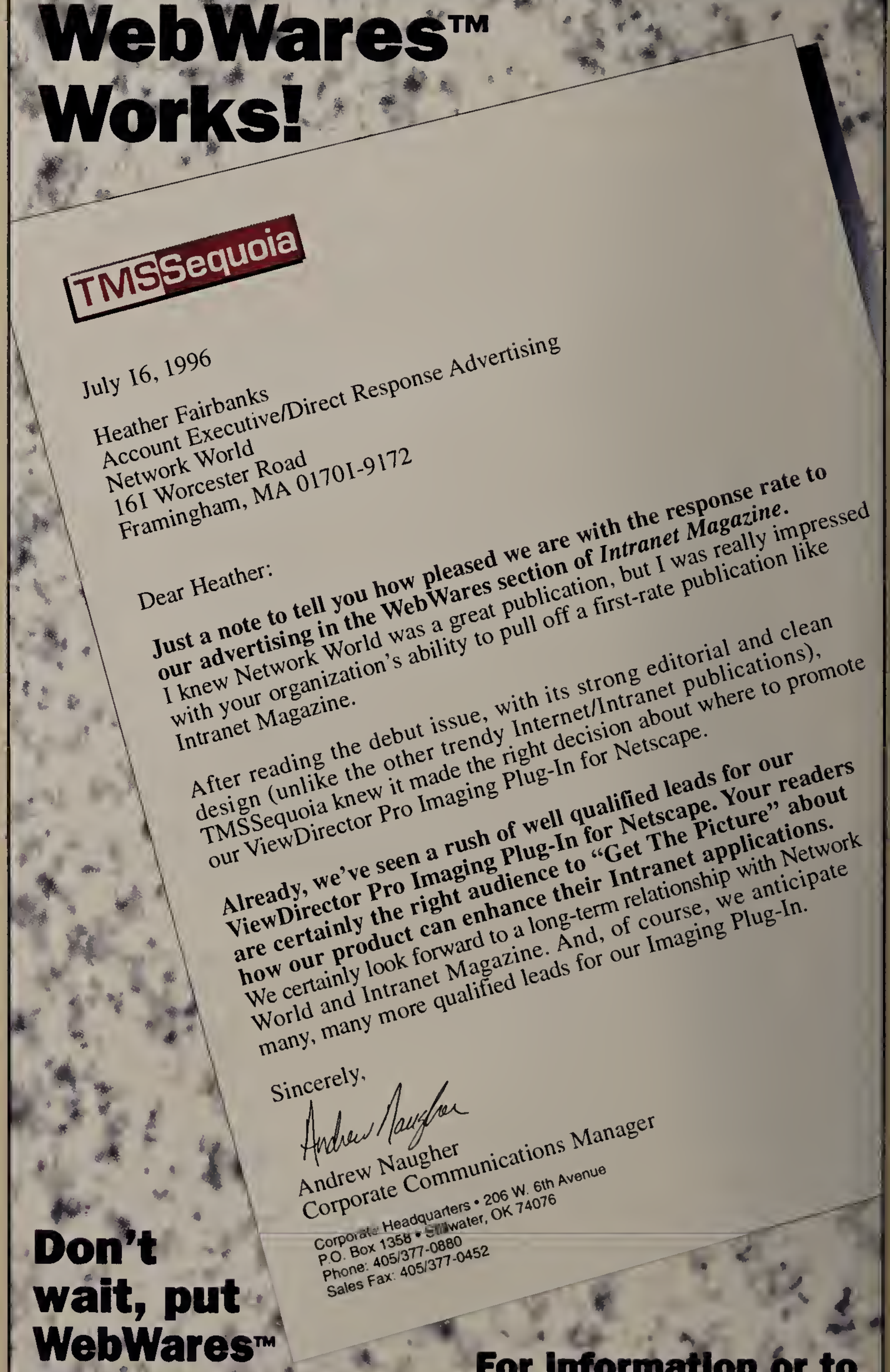

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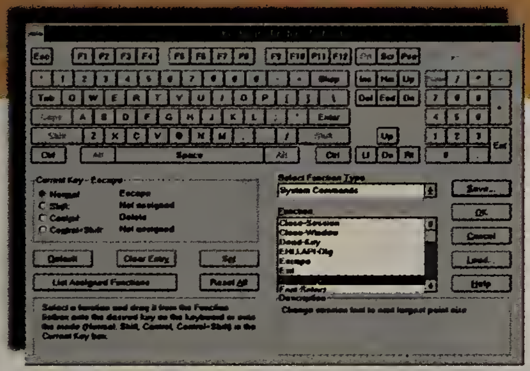

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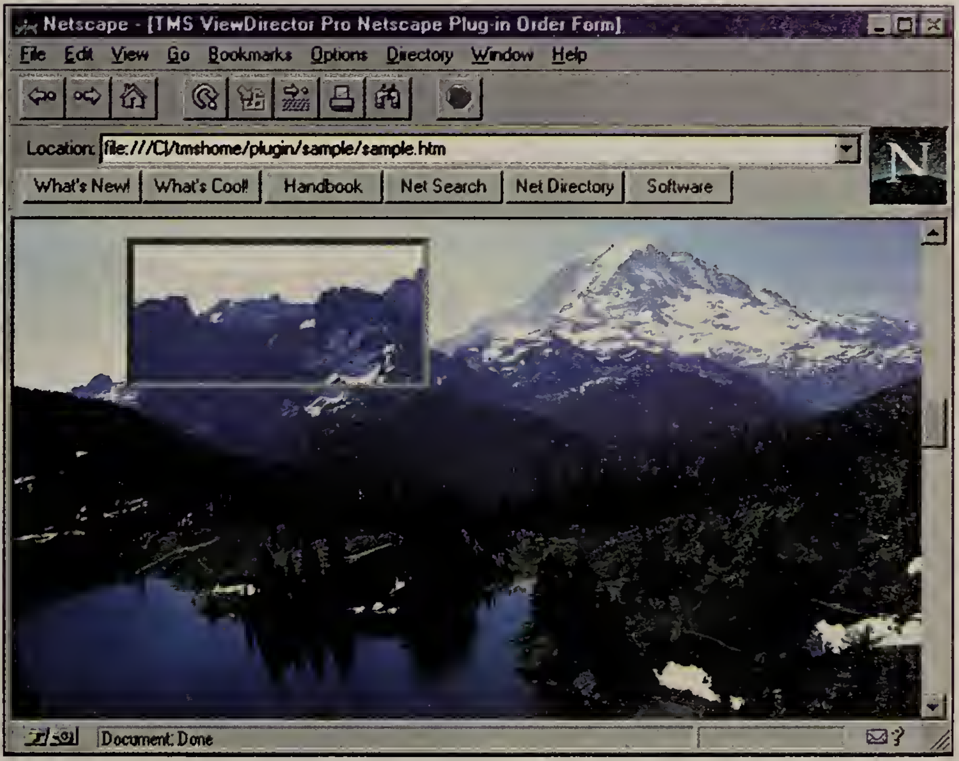
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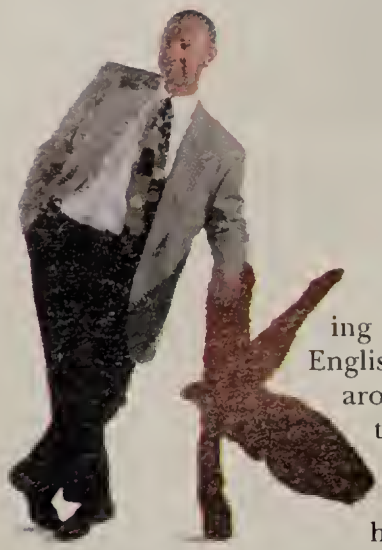
King Canute:

A Lesson for Intranet Managers



King Canute was quite a guy. He was king of the English, Danes and Norwegians, lived from around A.D. 994 to A.D. 1035 and was, if history is to be believed, the son of Svein Forkbeard. His real name (as opposed to his stage name) was Knut Sveinsson, and he also had a great line of kid's names — his sons were named Harold Harefoot and Hardacanute… but I digress.

It was probably after a heavy night of mead drinking that old 'Nute (as I suspect absolutely no one called him) figured that as his power was so great, he could command not only his subjects but nature as well. So, to prove how powerful he was, Canute had his courtiers carry him, in his throne no less, to the shore.

He stared at the sea for a bit and then commanded the tide to turn back. This was, of course, a dismal failure, and an older, wiser king with wet feet went back to kicking serfs around.

Now the legend of King Canute trying to turn back the tide is a fitting metaphor for how I believe many IT groups will attempt to manage the rising tide of intranet data.

The problem is that these IT groups think they have to control organizations' data. They assume that because they have traditionally had so much power and authority over the acquisition, storage, organization and access of organizations' data space that they will continue to have durable control.

Before I examine this issue more deeply, we need to define what an organization's data space is: It is the collection of data owned and managed by the organization to which a significant number of its members have common access. Thus, a parts catalog is usually within the organization's data space, while the E-mail that you sent to a particular supplier confirming receipt of his invoice is probably not. That correspondence resides in your personal data space.

Now the basis of IT's traditional control of data space was an economic one. Way back when mainframes were de rigueur, if the data you wanted the big iron to handle wasn't mission critical to the organization, you were plumb out of luck. But with the rise of minis and then PCs, the data resources of the corporation expanded rapidly. Data could be acquired and manipulated for an ever lower cost. Data acquisition and manipulation scaled down quickly from the departmental to the group and finally to the personal level.

The only thing that didn't change as rapidly was data ownership. The truth was that the vast majority of data being acquired and manipulated wasn't really part of the organization's data space at all — it was restricted to those individuals who had compiled it and those to whom they gave it.

The stuff that really defined the organization's collective knowledge was still under the control of the IT/MIS/whatever-you-want-to-call-them group.

That, my friends, is what defined the status quo. At least the status quo as we knew it because intranets are going to change all of that.

With intranets, complete control cannot be enforced, at least not if your intranet is going to be successful. The reason is that for an intranet to be truly successful, as broad a range of staff as possible must be able to publish and retrieve data. Worse still for IT, unless you have Draconian powers, efforts to control it will be ignored anyway (that's where the Canute thing comes into play).

ILLUSTRATION: JOEL NAKAMURA

My suggestion is that rather than trying to exert complete control, IT needs to adopt a new strategy: content control domains. The concept is to provide levels of control that are relevant in context.

Divide your intranet data space (it will become synonymous with the organization's data space) into three layers.

The top layer is the one where IT exerts strong control. In this layer, which we will term the Organization Domain, you create a strong visual image for the intranet. You provide simple navigation to all groups within the organization, access to search tools, resources and any other service that users will need. Anything added to this layer must conform to the design — the constraints are rigid, but if the data is relevant, it will be added.

The next layer, the Group Domain, is where the various functional entities in the organization have their data collections. This is where you'd expect to find workgroups cooking up marketing plans, creating sales collateral, developing products, managing workflow and so on. Also in this layer are the company squash ladder, the classifieds section and other attributes of corporate culture. Here the constraints should be loosened and more freedom in design and layout allowed.

The final layer is the Personal Domain, where users are encouraged to publish anything they consider relevant or interesting (including, if they please, the snapshots from their last holiday).

This layered approach will provide adequate structure without cramping anyone's style. Moreover, instead of pitting IT against the users by trying to enforce a rigid structure, it will provide a framework for the evolution of your intranet. And it will prevent you from looking like King Canute. ⊜

Gibbs is a writer, analyst and editorial consultant for IntraNet Magazine *and can be reached at mgibbs@gibbs.com.*

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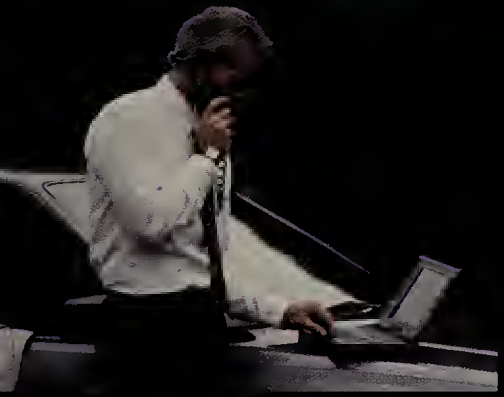

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Circle Reader Service #42

Technology Update

Keeping Up with Network Technologies and Standards

Distributed backup offers advantages in data-heavy client/server networks

By Peter Liu

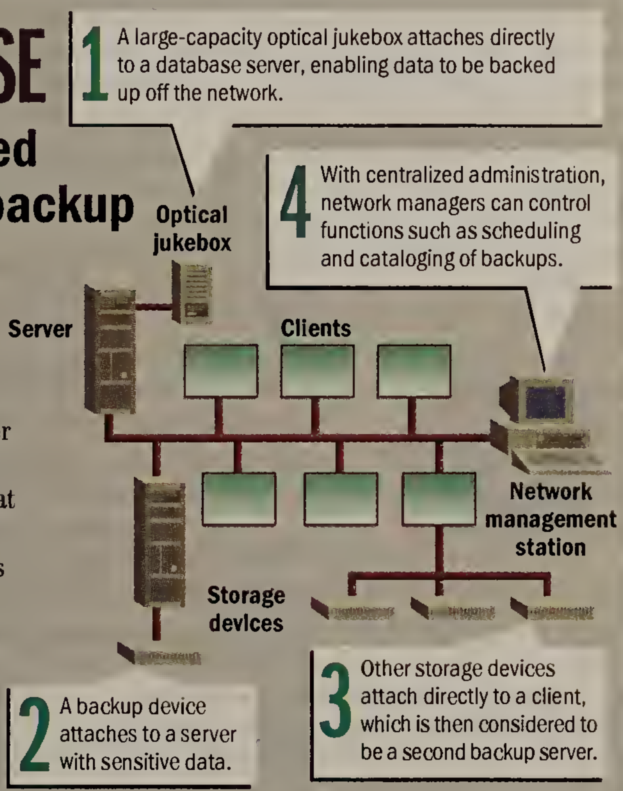
According to current estimates, data stored on networks is growing at the rate of more than 40% per year. Such growth brings about a variety of concerns, including how to back up that data.

While backup techniques are well established in mainframe environments, they are still evolving for client/server networks. They have progressed from isolated islands of storage and responsibility to environments where storage and control are completely centralized.

UP CLOSE

Distributed network backup

In a distributed backup scheme, storage devices can be attached to any networked computer — server or client — with a backup module that is centrally controlled. This allows storage devices to be located where they are needed most or where they fit best.



1 A large-capacity optical jukebox attaches directly to a database server, enabling data to be backed up off the network.

2 A backup device attaches to a server with sensitive data.

3 Other storage devices attach directly to a client, which is then considered to be a second backup server.

4 With centralized administration, network managers can control functions such as scheduling and cataloging of backups.

A new strategy, called distributed backup, entails distributing storage devices while retaining centralized control. Such a strategy can improve security for critical data now resident in network environments and alleviate the bandwidth problems created as larger and larger amounts of data travel over the network.

Backup in retrospect

Two basic backup decisions need to be made in any environment: Where will the backup images be stored? How will the backup process be controlled?

In early client/server networks, administrative control was isolated and restricted to individual PCs. As the data used on isolated PCs grew larger and more important, simple storage devices were used to back up that data. Usually, these were floppy disks or stand-alone tape cassette devices.

As the importance of the work done and the data stored on networks grew, backup procedures gradually became too critical to entrust to individual users. It became apparent that mainframe-strength backup software was needed.

Many of the features in mainframe backup software could easily be transferred to software designed for a client/server system where centralized control of backup processing is the aim. These features include centralized scheduling and device control, implementation of full, incremental and differential backup types, storage media pooling and backup image tracking and overwrite protection for unexpired backup images.

These sophisticated mainframe-derived backup functions made network backups far easier to implement and much more secure. However, the storage devices did not have large capacities and unattended backup capabilities so they had to be centrally placed. This can give rise to poor network performance and weak security because most of the data to be backed up must travel across the network.

Distributed backup

Because small capacity is no longer a limitation and unattended backup capabilities are now available, it is logical to combine the strengths of the isolated backup and centralized storage approaches. Distributed backup allows storage devices to be distributed throughout a network while retaining the advantages of centralized control. The backup's view is that any computer connected to a storage device is considered a server and all other computers are backup clients regardless of whether they are considered clients or servers in the overall network scheme.

The following benefits can result:

■ Any number of storage devices may be connected to the network for backup with far less performance degradation because multiple backup servers are employed.

■ Storage devices may be connected to the network at any computer that has a backup module residing on it.

■ Any computer that holds sensitive or a large amount of data may be directly connected to a storage device dedicated to its use.

■ If several computers are directly connected to storage devices, network traffic will be reduced considerably because data can travel directly to these devices rather than traveling over the network.

■ Backups complete more quickly when data is backed up to several distributed storage devices simultaneously. In addition, the time that data would normally take to travel to a storage device over a network is saved.

Even at a higher speed, throughput might not improve because the amount of data that can travel across a network is limited by its bandwidth.

■ The time needed to encrypt sensitive data is eliminated when data is backed up to a device directly. Such data would have to be encrypted before it enters the network and decrypted after it exits to ensure its integrity.

One of the most important aspects of a backup strategy, regardless of its environment, is control. Centralized administrative control of backups is still critical, even in a distributed scheme. Control of functions such as scheduling and catalog maintenance along with monitoring and error handling are more efficient and more likely to be performed regularly if one person is in charge.

Backup basics

Finding the best backup strategy for a particular site is a matter of striking a balance between the perfect solution to backup needs and what is possible given the restraints of time, resources and budget. Regardless, backup software for client/server networks must always have three characteristics — reliability, efficiency and flexibility.

If individual files from a backup or the entire backup image cannot be restored when needed, the backup is useless. Likewise, unless a backup completes quickly and uses resources efficiently, a full schedule of backups cannot be performed.

In a client/server environment, backup software also should be able to process data across networks running different operating systems and allow storage devices to be attached where needed instead of at one central site. This is important for security and crucial for reducing network traffic and preventing backup processing from overwhelming a network.

Liu is lead architect for network backup products at Syncsort, Inc. in Woodcliff Lake, N.J. He can be reached at info@syncsort.com.

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Be helpful

While you're in the Help Desk conference on Network World Fusion, come to the aid of your peers.

In Topic 73, a network administrator is looking for help in deciphering an error message appearing on the network.

It occurs when running a DOS program on a Microsoft Corp. Windows 95, Client32 workstation. The workstation is attached to a Novell, Inc. NetWare 3.12 LAN.

The error message reads:

"Network status Client32: Please wait while system retries request. To stop waiting, press Enter. [NetWare will then return an error and try to reconnect in the background.] OK"

In Topic 74, another network administrator is trying to make an image of a fully loaded laptop and then copy that image to several new laptops from a file server on a NetWare LAN.

The administrator has used Win95's XCOPY function with numerous command switches to get every file, including those, like the registry, that are hidden. However, when a Win95 DOS boot floppy is created for the laptop to access the file server and copy the image onto a new laptop, the XCOPY command switches are no longer there.

The administrator thinks a .DLL extension is referenced for the missing command switches, but isn't sure.

In Topic 75, a LAN administrator is looking for a NetWare 3.12 file transfer protocol-daemon (FTPD) NetWare Loadable Module (NLM) that will support users working on Macintosh computers from Apple Computer, Inc. Neil Freetly, a LAN administrator at the University of Wisconsin, says he has an FTPD NLM installed that came with the NetWare file server, but it will not support Macbinary II transfers.

If you have any suggestions, post them on Network World Fusion (http://www.nwfusion.com). Go to Forum, click on Help Desk then the appropriate topic.

EDITORIAL INSIGHTS

The URLification of America

I have seen them in print ads, heard them uttered on radio spots, zipped past billboards adorned with them and watched them flicker across my television screen. I have been invited by friends to visit their private Web pages and have been entrusted with their personal addresses.

I have stumbled over huge, impossible-to-remember URLs stuck amid sentences in press releases, news stories and feature articles. In magazines and newspapers that run the gamut of human experience, I have encountered "Best of the Web" articles and sidebars pointing me to hundreds of URLs for everything from convention coverage to farming. (Aside: Let's take this trend to the next step. *Special feature: The 10 best 800 numbers to call for turkey basting tips!*)

Last week, I saw a movie ad citing the Web site that employed the ecstatic reviewer, rather than a newspaper. "Smashing! Sheer unbridled joy pours out of *Matilda!* It's not too much to call it classic." Sheila Benson, Microsoft Cinemania (www.msn.com/cinemania).

I am, as are you, witnessing the URLification of America. Where will this all lead, your inquiring minds wonder? I humbly predict:

- URL tattoos will replace body piercing as the rage of the late '90s and early double-zeros (I am, as are you, struggling with what to call the early 2000s). The exhibitionists among us will adorn their necks and thighs with personal URLs, while the more amorous will etch their beloved's onto their biceps.
- To prevent conflicts in the future, the government will begin issuing URLs to newborns along with Social Security numbers.
- The URL Channel will garner more viewers than The Food Channel and The Nashville Network combined.
- Personal URLs will become the vanity plates of tomorrow. "Hey, baby, drop me a line at www.harvardguy.com."
- Kids across America will drop irritating prank E-mails to all those URLs. "Hey, harvardguy, ya got Prince Albert in a can? Better let him out!"

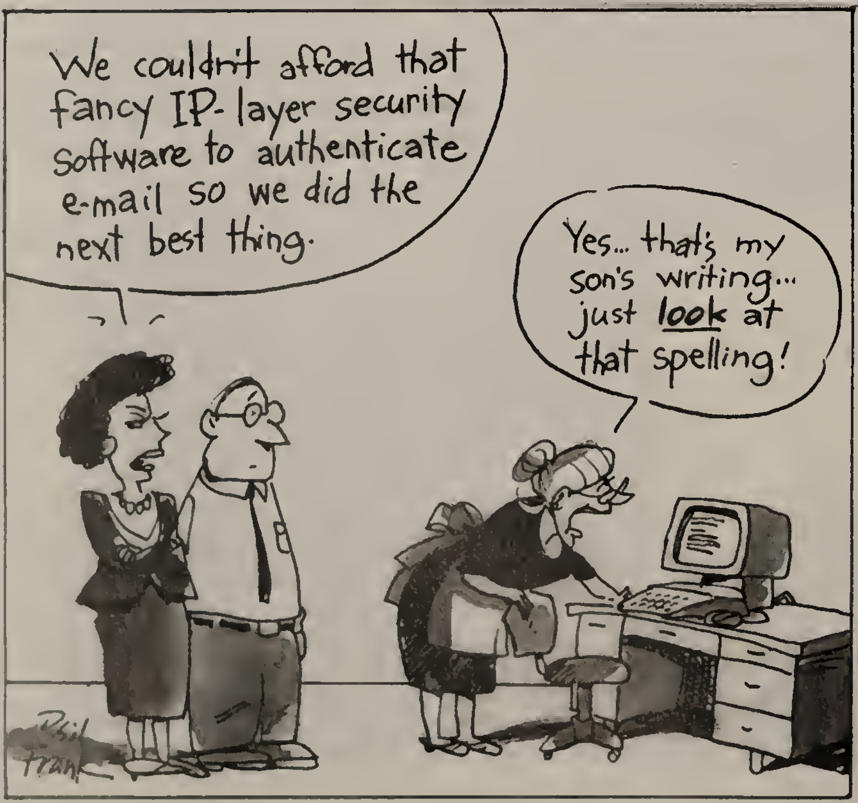
I'm just scratching the surface here, folks. Help me out. Where is the strangest place you've seen a URL, and what does the future hold for this URLed world?

Drop me a line at www.hoteditor.com. . .actually, at the humble address below.

John Gallant, editor in chief jgallant@nww.com

Teletoons

By Phil Frank and Joe Troise
baba@sfgate.com


We couldn't afford that fancy IP-layer security software to authenticate e-mail so we did the next best thing.
Yes... that's my son's writing... just look at that spelling!
Phil Frank

THE BLUE VIEW

SNA Battle Royal continues: Clarifying the fine points of SNA/LAN integration

Anura Gurugé

Last year, I wrote a two-part article on the pros and cons of the three main techniques for integrating SNA/Advanced Peer-to-Peer Networking traffic into a multiprotocol network: RFC 1490, Data Link Switching (DLSw) and APPN ("SNA Battle Royal," May 1, 1995, page 34, and Sept. 25, 1995, page 97). While the recommendations I made for choosing among these three techniques have been validated at numerous production networks, it's evident that there is still confusion regarding the nuances of various options.

In environments with few SNA/APPN destinations, DLSw or RFC 1490 has the edge over APPN. If in such cases frame relay is to be used as the WAN backbone, RFC 1490 is likely to be the better choice. However, if an IP-based backbone is the strategic WAN transport mechanism, or if the volume of non-SNA traffic — in particular, TCP/IP traffic — heavily outweighs the SNA/APPN traffic, DLSw is probably the best option. In networks with multiple SNA/APPN destinations, APPN is likely to be a better solution than the other two techniques.

> *Anything proprietary is frowned upon today. However, if there are no appropriate standards, vendors have no option but to create vendor-specific extensions.*

Many users are now applying these guidelines when choosing between DLSw and RFC 1490. But RFC 1490 in particular seems to be fraught with misunderstanding when it comes to issues such as multivendor interoperability and IBM's Boundary Access Node (BAN).

RFC 1490 is a simple encapsulation and frame segmentation standard for frame relay. It deals only with the encapsulation of routed (IP), Open Systems Interconnection and bridged traffic; it does not address SNA or APPN traffic. The encapsulation of SNA/APPN traffic within frame relay is covered by the Frame Relay Forum's FRF.3(.1) addendum to RFC 1490. So when most people talk about RFC 1490 in the context of SNA/APPN, they are essentially referring to RFC 1490/FRF.3(.1).

Neither FRF.3(.1) nor RFC 1490, however, deals with issues very dear to SNA users, such as reducing or eliminating unnecessary end-to-end acknowledgments across the WAN, integrating Binary Synchronous Communications (BSC) and asynchronous traffic, implementing Synchronous Data Link Control to Logical Link Control 2 (LLC2) conversion, name caching to eradicate repetitive broadcasts and incorporating voice traffic. Given that a frame relay access device aimed at the SNA community would be somewhat impotent without many of these capabilities, FRAD vendors have been forced to resort to using proprietary schemes to deliver the functionality not addressed in RFC 1490/FRF.3(.1).

Anything proprietary is frowned upon today. However, if there are no appropriate standards, vendors have no option but to create vendor-specific extensions.

Without these so-called proprietary solutions, networking would not be what it is today and FRADs in particular would be rather insipid. When talking about proprietary solutions, especially in the context of SNA/APPN, we should never lose sight of the fact that SNA has never been and never will be a standard in the conventional sense: It is a proprietary architecture controlled by IBM.

When it comes to multivendor interoperability, FRAD users sometimes encounter problems due to these proprietary extensions, particularly when it comes to facilities such as BSC and LLC2 acknowledgment optimization. So a word of caution: When evaluating RFC 1490 FRADs, pay close attention to the nonstandard value-added features, particularly if interoperability is a latent requirement.

The good news is that, in general, it is possible to achieve interoperability between FRADs from different vendors. The value-added features may preclude Vendor A's FRAD from directly interoperating with Vendor B's FRAD across the WAN. However, interoperability can be achieved by using another FRAD from Vendor A in front of the FRAD from Vendor B. This additional FRAD will strip out any proprietary functions used by Vendor A and reconstitute the traffic into its original form.

IBM's BAN variant is another source of confusion. Though it is RFC 1490 compliant, BAN is not based on the FRF.3(.1) standard for SNA/APPN traffic. Instead, it uses the source route bridging format prescribed in RFC 1490, which is 16 bytes longer than the format specified by FRF.3(.1).

Though its overhead is greater, BAN minimizes the administrative effort of implementing a FRAD-based network. Many users are willing to compromise some network efficiency to benefit from the plug-and-play aspect of BAN.

However, BAN requires using a serial port as an interface between an IBM 3745 or 3746 and the frame relay WAN. This tends to be very expensive. Invariably, it is much more cost-effective to pursue a LAN-based option, such as a LAN-attached FRAD in front of a 37xx, 3172 or equivalent. This is another choice that should be carefully evaluated both in terms of efficiency and cost.

The bottom line is that in addition to the macrolevel decisions involved in evaluating DLSw, RFC 1490 and APPN, there are various crucial microlevel issues, such as interoperability and efficiency, that need to be taken into account. Ignoring these microlevel issues could jeopardize your overall evaluation criteria.

So when strategizing your SNA Battle Royal, make sure that you pay attention to the details in addition to your end goal.

Gurugé is an independent consultant specializing in internetworking and IBM network architectures. He can be reached at (603) 878-1303 or via the Internet at aguruge@mcimail.com. His new book Reengineering IBM Networks *is available from John Wiley & Sons.*

TOLLY ON TECHNOLOGY

Ethernet switches turn in stunning performance

Kevin Tolly

While 100M bit/sec and Gigabit Ethernet are commanding significant industry attention, it's important not to forget how the humble 10M bit/sec Ethernet switch is changing the face of campus networking. A plethora of switches, from both well-known vendors and new players, are serving up bandwidth almost faster than network managers can handle it — often at bargain-basement prices.

Performance has always been a prime concern of providers and buyers of Ethernet gear. Design engineers spent the better part of a decade in pursuit of perfection — wire speed. And, prior to the introduction of LAN switches, wire-speed performance was becoming almost commonplace in traditional campus LAN bridge/routers. But could such performance easily be replicated in these mega-bridges called switches?

As part of The Tolly Group's 1996 Industry Study of Ethernet Switches, we set out to answer this question. We evaluated more than a dozen products from industry stalwarts such as Cabletron Systems, Inc., Cisco Systems, Inc., Fore Systems, Inc., Hewlett-Packard Co., IBM, 3Com Corp. and UB Networks, Inc., as well as newer entrants such as Acacia Networks, Inc., Asante Technologies, Inc., Ornet Data Communications Technologies, Inc., U.S. Robotics and Xylan Corp. (The features and functions of these products were covered in our July 1 article, ''Comparing LAN switch contenders: Beyond performance.'')

So how do these boxes perform? In a word, stunningly. How else can you describe results in which the average throughput in almost every performance test is wire speed?

To test raw throughput of 10M bit/sec ports, we incrementally tested as many as six pairs of ports (12 ports) at Ethernet's smallest and largest frame sizes (64 bytes and 1,518 bytes, respectively), as well as one size in between (512 bytes). Using a Fore/Alantec Corp. Powerbits packet generator/analyzer to generate simultaneous streams, we attempted to load each switch to wire speed. We succeeded. And the switches succeeded in passing the traffic — all of it. One vendor ''trailed'' the pack, reaching a mere 99% of wire speed. (Note: Ethernet limits the number of packets per second per port to 14,879. For 64-byte packets, that produces wire-speed results that are actually significantly below 10M bit/sec.)

Performance results were linear. As more ports were added, performance did not degrade. Granted, we chose to test with only 12 ports active simultaneously. But this 100% per-port load probably exceeds the practical load that would be placed on an Ethernet switch running even 40 ports of 10M bit/sec Ethernet.

Because high-speed uplinks are so important, we evaluated how well up to 10 input ports of 10M bit/sec Ethernet could be consolidated onto a single Fast Ethernet uplink. Again, results were near perfect, with virtually every box able to pump out small, midsize and large frames onto the Fast Ethernet link. And again, results were linear, with throughput remaining good as the number of input ports were increased.

So is there a performance story? Yes, but it's a subtle one. While evaluating switch latency, we noticed that not all cut-through and store-and-forward switches exhibit identical latency. The impact of that fact is more difficult to establish. And we determined that many cut-through switches intentionally become store-and-forward switches when multicast or broadcast frames are encountered. One even enters this mode when an unknown unicast frame is processed. With wire speed a given, traditional performance metrics become almost meaningless.

Ethernet switch performance must be redefined as Ethernet switch behavior and focus on areas such as broadcast throttling, full-duplex support and media access control address-table depth. Anticipating our performance results, we've run a first round of tests in these areas.

Tolly is president of The Tolly Group, a strategic consulting and independent testing firm in Manasquan, N.J. He can be reached at (908) 528-3300 or via the Internet at ktolly@tolly.com.

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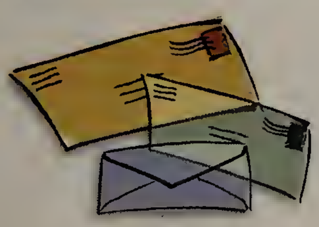

No joking matter

I found myself both amused and concerned after reading your article ''Windows NT sent to the presses'' (Aug. 5, page 8). Here we have a company (Microsoft Corp.) that, in announcing its new release of NT, cracked jokes about ''how laughable previous versions of Windows NT have been.''

As I recall, Microsoft has been telling us for some time that these ''laughable'' versions were God's gift to us with respect to operating system software. So now I'm supposed to feel comfortable with them and this version of NT. Somehow the idea of anyone betting their business on such products or companies makes little, if any, sense.

Hal Hensley
Principal
Hensley & Associates, L.C
San Antonio, Texas

Hold the phone

After reading Skip MacAskill and Melinda Le Baron's column ''Technical support on the Web isn't always easy to find'' (Aug. 12, page 25), we find it hard to believe that in today's technology-driven world, the authors' suggestion is to rely on the telephone. Obviously MacAskill and Le Baron do not run a cost-center business like technical support. We find ourselves and our clients constantly finding ways to improve customer service through uses of nontraditional media such as the Internet.

We suggest the authors spend a little more time investigating the advantages of new technologies. It is very clear that the end user — the customer — demands this type of option.

Duncan Shaw and Tammy Dove
Buffalo, N.Y.

No controlling the 'Net

In his column ''How free should the Internet be?'' (Aug. 12, page 28), Marc Myers concludes: ''It's only a matter of time before government is going to have to step in and institute some controls.'' I'm afraid it's too late for that — the 'Net is out of control.

The Internet is creating a new world populated by virtual social groups. These groups will develop and start guiding the future — above and beyond the control of government.

The only way for government to stop, control or intervene in what occurs on the 'Net is to destroy the 'Net.

We are about to witness the creation of new a government and a new social order that will exist outside of the physical boundaries of today's world. The governments that embrace this new global entity will survive. Those that don't will find themselves fighting a losing battle, effectively neutered by technology that will make their attempts impossible.

Scott Lemon
Heber City, Utah

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Gotcha!

By James Kobielus

Doing business on networks can be risky given that users, messages, documents, software, servers and other online entities may not always be what they seem. As you permit more users — be they employees, customers or suppliers — to access your network, it raises the specter of ubiquitous spoofing in which the authenticity of anybody or anything cannot be taken for granted.

Password protection alone is not up to the challenge of securing network access. Hackers can guess or intercept plain-text passwords and pass themselves off as authorized users. Electronic messages and files can be modified by unauthorized third parties before they reach their intended recipients.

To get safeguards above and beyond mere passwords, you need a network authentication product. The dozens of such products available today enable you to spoofproof your networks by using cryptographic techniques to verify the origin and integrity of users, resource requests, files, messages, packets, software modules and network nodes.

While the products differ greatly in architecture, they all rely on a logon procedure involving at least two authentication factors — a password plus something else such as a secure token, challenge-and-response dialogue, smart card and reader, biometrics, digital signature, or public- or private-key cryptography.

There are two broad product categories: user authentication offerings that primarily deliver single sign-on (SSO) access to network resources, and object authentication products that validate the authenticity and integrity of messages and files in addition to the users who originated them.

Vendors typically provide programming tools so you can integrate their products into your network. For instance, some products are implemented as stand-alone authentication servers but come with tools for adding code to your existing workstations. Others give you the code needed to add authentication services to existing clients and servers.

An authentic user

User authentication products utilize hardware- or software-based tokens to respond to cryptographic challenges issued from authentication servers. When you initiate a network logon with your user identification and password, you receive a numeric string.

If you have a handheld hardware token device, you type in that string and your personal identification number (PIN). The token uses a secret algorithm and key to produce what is essentially a onetime, nonrepeatable session password, and then displays it on an LCD screen. You enter that session password on your computer, and if it matches the authentication server's expectation, you're granted access.

Security Dynamics Technologies, Inc. took this challenge-and-response process one step further with its SecurID token, which generates an unpredictable, onetime access code every 60 seconds. With SecurID, you enter your user ID and Security Dynamics' ACE/Server prompts you for a password. In turn, you enter your PIN plus the current access code displayed on the token's LCD. The server keeps track of the access codes it expects to see at any instant and grants access if there is a match.

Using handheld token devices can be an awkward affair. You have to juggle two input devices, the computer keyboard and token device keypad, as well as two display devices, the computer monitor and the token device's LCD.

Software tokens are often preferable because they work in the background and make it unnecessary to enter anything more than a password or PIN. The software token responds to messages from the authentication server.

The vendors with the broadest range of token types are Communication Devices, Inc., MicroFrame, Inc. and Security Dynamics. Each vendor provides handheld, software and in-line tokens. In-line tokens typically connect to the RS-232 port of a PC or laptop, and from there to a modem.

Communications Devices and MicroFrame also allow pagers to be used as receive-only tokens. The pager receives a numerical challenge string, which you enter into a computer.

High-tech though they may be, tokens are only as secure as the passwords or PINs that users must enter into them. Yet, when implemented and used correctly, tokens provide strong mathematical assurances that the user, information or network resource in question is the proverbial Real McCoy.

To get really secure, you should use biometrics such as fingerprint, voice or face recognition: These factors are difficult to steal or copy. A good use for biometrics is for securing access to resources that only a few authorized people are allowed to view or use — the recipe for Coca-Cola or systems capable of launching missile attacks, for example. Mytec Technologies, Inc. and Secure Computing Corp. are among the vendors supporting third-party biometrics products.

The exchange of token and biometrics information between server and client is handled by SSO standards such as Remote Authentication Dial-In User Service (RADIUS), Terminal Access Control Access Control System (TACACS) and Kerberos.

You should look into RADIUS- and TACACS-compliant products if your primary requirement is to authen-

This lineup of authentication products can help you weed out those phonies lurking behind false credentials.

ticate user access to external communications gateways, dial-up routers, system administration and maintenance ports and firewalls.

Typically, the RADIUS- or TACACS-compliant authentication server handles requests from authentication client software installed at the gateway or network entry point. The authentication server maintains a database of user IDs, passwords, PINs and private keys, which it uses to grant or deny network access.

Compatibility with its installed base of Shiva Corp. LanRover communications gateways is one of the factors that led San Bernardino County, Calif., to choose Defender Security Server from AssureNet Pathways, Inc. (formally Digital Pathways, Inc.). Other critical factors in the product's favor were its user-friendly Windows-based administration package and its onetime — as opposed to annual — charges for authentication and encryption keys, says Michael Meakim, county information systems security officer.

San Bernardino County — the largest county by land area in the U.S. — uses Defender Security Server to authenticate users on remote dial-in links to its internal network. Shiva servers route access requests via microwave communications links to the central Defender Security Server system. Users can then employ a hardware or software token to authenticate themselves. Meakim recommends that laptop users go with a handheld hardware token that can be stored separately from the computer, thus gaining an extra measure of security.

To control corporate network access to internal applications, file servers and databases, look at products based on SSO technologies such as Kerberos, the Open Software Foundation, Inc.'s Distributed Computing Environment, Secure European System for Applications in a Multivendor Environment, or Distributed Authentication Security Service. These standards enable you to implement logon procedures that are consistent across all applications, servers and databases.

Object of authentication

For the authentication of messages, files and other objects transmitted and stored on your network, consider products that use digital signature technology based on RSA Data Security, Inc.'s Public Key Cryptography Standards (PKCS), Digital Signature Algorithm, X.509, Pretty Good Privacy (PGP) and other public-key technologies. A digital signature is an alphanumeric string that authenticates the originator of an object and attests to the fact that the object has not been altered.

To produce a digital signature, the original object is processed through a hashing program such as Secure Hash Algorithm, Message Digest 2, and MD 5, which modifies and truncates the object's bit string in a deterministic fashion. The product of the hashing program is encrypted with the originator's private key, producing the digital signature string that is then attached to and transmitted with the original object, along with a public key that can be used to validate it.

The recipient can verify the digital signature by decrypting it with the originator's public key to recover the transmitted hash and then running the hash program again. If the resulting bit string, or hash, is identical to the one transmitted, there's more than enough reason to believe the object originated with the purported sender and was not modified.

What makes digital signatures secure is their reliance on public-key cryptography, which never requires message originators to share their private keys with another soul. Public keys should be disseminated far and wide, and the format used for this is a public-key certificate, which often uses X.509 syntax. Certificates are issued by a trusted third-party and include the public key along with proof that the key belongs to a particular user or company.

A recipient simply obtains a certificate from a central repository such as a Web site and extracts the originator's public key from it to verify the digital signature.

In evaluating digital signature products, you need to know how tightly they are integrated with your current client operating environments, E-mail systems, Web browsers and other applications. AT&T Government Markets' SecretAgent provides such tight integration by sending digitally signed documents as file attachments to E-mail messages.

THE PRICING MIX

Network authentication products usually carry a per-user charge for tokens and client software as a starting point. Some vendors charge separately for server software and application development tools. Products supporting single sign-on usually include a client and server, while digital signature products that integrate with E-mail are often priced on a per-client basis.

ILLUSTRATION: B. HALSTEAD-HANNAH

Network authentication products

Company	Product	Platform		Networks or protocols	Standards												Key type		Token type		Security/Attack-handling techniques							Pricing
		Client	Server/host		DASS	DCE	DES	DSA	Kerberos	MDA	RADIUS	RSA	SESAME	SHA	TACACS	X.509	Public	Private	Hardware	Software	Password encryption	Password kept in token memory	Onetime password or session key	Limit on number of authentication attempts	Token deactivates when authentication limit reached	Account disabled when authentication limit reached	Alert sent for rejected authentication attempt	U - User S - Server
ActivCard, Inc. (415) 654-1700	ActivCard	OS/2, Windows 3.1, NT, 95	MVS, Unix, Windows NT	HTTP, IPX/SPX, NETBIOS, NetWare, TCP/IP, Windows NT Server	✓	✓	✓				✓				✓		✓	✓	✓	✓			✓		✓	✓	✓	U: $30-$66
AssureNet Pathways, Inc. (800) 344-7284	Defender Security Server	DOS, Macintosh, Windows 3.1, NT, 95	NetWare, Windows 3.1, NT, 95	IPX/SPX, TCP/IP			✓												✓	✓				✓	✓	✓	✓	U: $55-$105 S: $1,995
AT&T Government Markets (800) 203-5563	SecretAgent	DOS, Macintosh, Unix, Windows 3.1, NT, 95	Macintosh, Unix, Windows 3.1, NT, 95	AppleTalk, LAN Manager, LAN Server, NetWare, TCP/IP, VINES, Windows NT Server			✓	✓				✓		✓		✓	✓	✓	✓			✓			✓			U: $190
	Surity DSA Signature Software	DOS, Unix, Windows 3.1, NT, 95	Unix, Windows 3.1, NT, 95	LAN Manager, LAN Server, NetWare, TCP/IP, Windows NT Server				✓						✓		✓	✓	✓	✓			✓			✓			U: $150
Atalla (Div. of Tandem Computers, Inc.) (800) 523-9981	Challenge/Response	Not applicable	Tandem computers	Not applicable			✓												✓				✓					(1)
	WebSafe II Internet Security Processor	Not applicable	Macintosh, MVS, OS/2, Unix, Windows 3.1, NT, 95	SSL, TCP/IP			✓	✓		✓		✓		✓			✓	✓										(1)
Axent Technologies, Inc. (301) 258-2620	Omniguard/Enterprise Sign On	DOS, Windows 3.1, 95	MVS, NetWare, Unix	IPX/SPX, NetWare, TCP/IP			✓										✓			✓	✓	✓	✓	✓	✓	✓	✓	Individual case basis
Bull Worldwide Information Systems (800) 285-5727	ISM/OpenMaster	DOS, Macintosh, OS/2, Unix, Windows 3.1, NT, 95	Unix	LAN Manager, NETBIOS, NetWare, SNA, TCP/IP, Windows NT Server		✓	✓			✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	U: $100-$200
Cisco Systems, Inc. (800) 848-3440	MultiNet Secure/IP	OpenVMS	OpenVMS	TCP/IP			✓												✓	✓	✓		✓	✓				U: $8-$60 (2)
	CiscoSecure	DOS, Macintosh, OS/2, Unix, Windows 3.1, NT, 95	Unix	AppleTalk, IPX/SPX, NETBIOS, NetWare, TCP/IP, VINES			✓								✓			✓		✓	✓		✓	✓				U: $263
CKS North America (412) 928-3300	**MyNet**	**DOS, OS/2, Windows 3.1, NT, 95**	**MVS**	**DECnet, IPX/SPX, LAN Server, NETBIOS, NetWare, SNA, TCP/IP, Windows NT Server**			✓		✓		✓						✓	✓	✓		✓		✓	✓	✓			**U: $200**
Communication Devices, Inc. (201) 772-6997	SafeGuard	DOS, OS/2, Windows 3.1, NT, 95	Independent	Transport-independent			✓											✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	U: $30
CryptoCard, Inc. (800) 307-7042	RB-1 and easyRADIUS	Windows 3.1, NT, 95	Windows 3.1, NT, 95	Not applicable			✓				✓				✓			✓	✓		✓			✓	✓		✓	U: $100 S: $3,500
CyberSafe Corp. (206) 391-6000	Challenger	Macintosh, Unix, Windows 3.1, NT, 95	Unix	Transport-independent					✓									✓	✓		✓		✓			✓		U: $60+ S: $4,800+
CyberSoft, Inc. (610) 825-4748	CIT	DOS, Unix, Windows 3.1, NT, 95	Unix, Windows 3.1, NT, 95	Transport-independent						✓																		U: $15-$90 (3)
Cygnus Support (800) 294-6871	KerbNet	Macintosh, Unix, Windows 3.1, NT, 95	Unix	TCP/IP			✓		✓									✓	✓	✓	✓	✓	✓				✓	U: $15-$150+
Cylink Corp. (800) 533-3958	Secure Access System	Macintosh, Windows 3.1, NT, 95	Unix	Transport-independent			✓	✓						✓		✓	✓	✓		✓	✓		✓	✓	✓	✓	✓	U: $50-$295
DataLynx, Inc. (619) 560-8112	Guardian	Unix	AOS/VS, Unix	TCP/IP																	✓		✓	✓		✓	✓	U: $700-$4,200
	SuGuard	Unix	Unix	TCP/IP																				✓			✓	U: $400-$1,000 S: $1,000-$2,400
Devon Software Corp. (800) 845-1140	KyberPass	Windows 3.1, NT, 95	Windows 3.1, NT, 95	TCP/IP			✓			✓		✓				✓	✓	✓	✓	✓	✓	✓	✓				✓	U: $30 S: $500-$5,000
ICL, Inc. (703) 648-3300	AccessManager	Unix, Windows 3.1, NT, 95	MVS, NetWare, OS/2, Unix, Windows 3.1, NT, 95	IPX/SPX, LAN Manager, NETBIOS, NetWare, TCP/IP, Windows NT Server		✓	✓		✓	✓		✓	✓				✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	U: $35-$100
Information Resource Engineering, Inc. (410) 931-7500	SafeNet/Dial Secure Modem and AX200, 400, 500, 600 Encrypting Tokens	DOS, Macintosh, OS/2, Unix	Macintosh, MVS, OS/2, Unix, Windows	TCP/IP			✓	✓						✓			✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	U: $295
LeeMah DataCom Security Corp. (510) 786-0790	SafeAccess Server	Windows 3.1, NT, 95	Windows NT	IPX/SPX, TCP/IP, other			✓				✓				✓			✓	✓	✓			✓	✓			✓	U: $50 S: $2,300
MicroFrame, Inc. (908) 494-4440	Passkey, SegaSys, Sentinel 2000 and Softkey Plus	DOS, Windows 3.1, NT, 95	Proprietary	TCP/IP, other			✓											✓	✓	✓		✓	✓	✓	✓	✓	✓	U: $65 S: $1,250-$3,000
Mytec Technologies, Inc. (416) 467-3322	True Recognition System	Windows NT, 95	Windows NT, 95	Proprietary serial													✓	✓	✓									Individual case basis
Northern Telecom, Ltd. (613) 765-5607	Entrust	Macintosh, Unix, Windows 3.1, NT, 95	Unix	TCP/IP			✓	✓		✓		✓				✓	✓	✓	✓		✓	✓	✓	✓	✓			U: $159 S: $6,000

Product names highlighted in color were selected for the Short List.

Chart compiled by Kathy Scott

Footnotes:

(1) Vendor would not supply information.
(2) Price for unlimited usage is $15,000.
(3) Free when purchased with VFind antivirus product for Unix.
(4) Price is for concurrent users.
(5) User price is per year; server license renewal is $95.

DASS = Distributed Authentication Security Service
DCE = Distributed Computing Environment
DES = Data Encryption Standard
DSA = Digital Signature Algorithm
MDA = Message Digest Algorithm
RADIUS = Remote Authentication Dial-In User Service
SESAME = Secure European System for Applications in a Multivendor Environment
SHA = Secure Hash Algorithm
SSL = Secure Sockets Layer
TACACS = Terminal Access Controller Access Control System

Network authentication products

Company	Product	Platform		Networks or protocols	Standards												Key type		Token type		Security/Attack-handling techniques							Pricing
		Client	Server/host		DASS	DCE	DES	DSA	Kerberos	MDA	RADIUS	RSA	SESAME	SHA	TACACS	X.509	Public	Private	Hardware	Software	Password encryption	Password kept in token memory	Onetime password or session key	Limit on number of authentication attempts	Token deactivates when authentication limit reached	Account disabled when authentication limit reached	Alert sent for rejected authentication attempt	U - User S - Server
OpenVision Technologies, Inc. (800) 223-6736	Axxion-Authenticate	Unix, Windows NT, 95	Unix	TCP/IP			✓		✓				✓		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	S: $4,800
Oracle Corp. (800) 672-2531	Advanced Networking Option	Macintosh, OS/2, Unix, Windows 3.1, NT, 95	Macintosh, MVS, NetWare, OS/2, Unix, Windows 3.1, NT, 95	AppleTalk, DECnet, IPX/SPX, LAN Manager, LAN Server, Named Pipes, NETBIOS, NetWare, SNA, SSL, TCP/IP, VINES, Windows NT Server		✓	✓		✓	✓		✓	✓				✓	✓	✓		✓	✓	✓		✓			U: $295 (4)
Racal Data Group (800) 722-2555	Trust Me	Windows 3.1, NT, 95	Windows NT	AppleTalk, IPX/SPX, TCP/IP, Windows NT Server			✓				✓				✓			✓	✓	✓			✓	✓	✓	✓	✓	S: $1,695
Regnoc Software (510) 806-0713	The Signature Program	Windows 3.1, NT, 95	Windows 3.1, NT, 95	IPX/SPX, LAN Manager, LAN Server, NETBIOS, NetWare, TCP/IP, Windows NT Server														✓			✓					✓		U: $10
Secure Computing Corp. **(800) 692-5625**	Lockout Fortezza	DOS, Macintosh, Unix, Windows 3.1, NT, 95	Unix	TCP/IP				✓						✓	✓	✓	✓		✓	✓		✓	✓	✓	✓	✓		U: $39 S: $4,500-$12,000
	SafeWord AS	**DOS, Macintosh, Unix, Windows 3.1, NT, 95**	**Macintosh, MVS, Unix, Windows 3.1, NT, 95**	**LAN Server, NetWare, SNA, SSL, TCP/IP**			✓	✓							✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**U: $40-$188**
Security Dynamics Technologies, Inc. **(800) 732-8743**	**SecurID Token and ACE/Server**	**Macintosh, Unix, Windows 3.1, NT**	**Unix, Windows 3.1, NT**	**AppleTalk, DECnet, NetWare**		✓	✓		✓		✓				✓				✓	✓	✓		✓	✓	✓	✓	✓	**S: $2,450**
Vasco Data Security, Inc. (708) 932-8844	AccessKey II	DOS, MVS, OS/2, Unix, Windows 3.1, NT, 95	MVS, OS/2, Unix, VAX/VMS, Windows 3.1, NT, 95	Not applicable														✓	✓				✓		✓			U: $89
VeriSign, Inc. (415) 961-7500	Digital ID	Not applicable	Unix	Named Pipes, SSL, TCP/IP, Windows NT Server			✓			✓		✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	U: $6-$24 S: $290 (5)
ViaCrypt (800) 536-2664	ViaCrypt Pretty Good Privacy	DOS, Macintosh, Unix, Windows 3.1, NT, 95	Not applicable	Not applicable						✓		✓					✓	✓			✓		✓					U: $149

Product names highlighted in color were selected for the Short List.

Chart compiled by Kathy Scott

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SESAME = Secure European System for Applications in a Multivendor Environment
SHA = Secure Hash Algorithm
SSL = Secure Sockets Layer
TACACS = Terminal Access Controller Access Control System

Network authentication products

The Short List highlights products that Network World *recommends you examine when shopping for network authentication. Products listed here provide single sign-on (SSO) access for diverse environments, support a wide range of authentication standards and secure tokens, and include sophisticated programming interfaces and tools. Each product can meet the needs of users with multivendor enterprise networks. Your needs may differ.*

CKS North America's MyNet is among the most open products on the market. It provides SSO for many third-party offerings that support Kerberos or the Remote Authentication Dial-In User Service (RADIUS) and works with a broad range of third-party hardware tokens. It authenticates applications running on a vast number of platforms, including Windows NT, 95 or 3.1, as well as Unix, DOS, OS/2, NetWare, LAN Server, MVS and AS/400.

More telling is that MyNet pulls data from a wide array of existing system security databases — such as IBM's Resource Access Control Facility, Computer Associates International, Inc.'s ACF2 and TopSecret, and Banyan Systems, Inc.'s StreetTalk — into its own and can propagate updates to all those databases.

Security Dynamics Technologies, Inc.'s SecurID token and **ACE/Server** software work with more than two dozen third-party remote access, ISDN and firewall products. SecurID's innovative time-based authentication algorithm has been incorporated in more software and hardware tokens than just about any competing technology. Already among the most formidable players in the market, Security Dynamics has gotten even stronger with its recent acquisition of security powerhouse RSA Data Security, Inc.

On top of supporting a broad range of fourth-generation language programming interfaces to its SSO environment, the firm now offers RSA's industry-leading cryptography software development tool kits, including BSAFE 3.0 and Toolkit for Interoperable Privacy-Enhanced Messaging. Security-relevant users and resource data can be imported into ACE/Server from many legacy SQL and Open Database Connectivity-compliant databases, including those from Oracle Corp. and Sybase, Inc.

Secure Computing Corp.'s SafeWord offers very high-power authentication by supporting concurrent processing, dynamic load balancing and mirroring among as many as four fault-tolerant servers.

The product is designed to support up to 100 authentications per second and a database of more than 100,000 users per server. SafeWord provides SSO for a broad range of third-party remote access and communications platforms, and provides APIs that enable you to integrate it with additional products that support the Terminal Access Control Access Control System, RADIUS, Challenge-Handshake Authentication Protocol, Password Authentication Protocol or Secure Computing's Extended Authentication and Single Sign-on Protocol. SafeWord works with Secure Computing's hardware and software tokens and with many third-party tokens.

The Signature Program from Regnoc Software is nicely integrated with Windows-based applications, thanks to its use of OLE 2.0 to digitally sign any document created in Windows. ViaCrypt's ViaCrypt PGP uses a less elegant, but no less effective, technique to achieve integration with a wide range of Windows- and Macintosh-based applications. ViaCrypt 2.0 cuts text from messaging applications to the Windows or Macintosh clipboard, digitally signs it there and pastes it back into the body of the message.

One issue you'll face in implementing digital signatures is designating an organizational and technical entity known as a certification authority (CA). The CA's function is to issue, electronically publish under its own digital signature and, as necessary, revoke public-key certificates. A message recipient might download the originator's certificate from a CA's Web

Calling all vendors

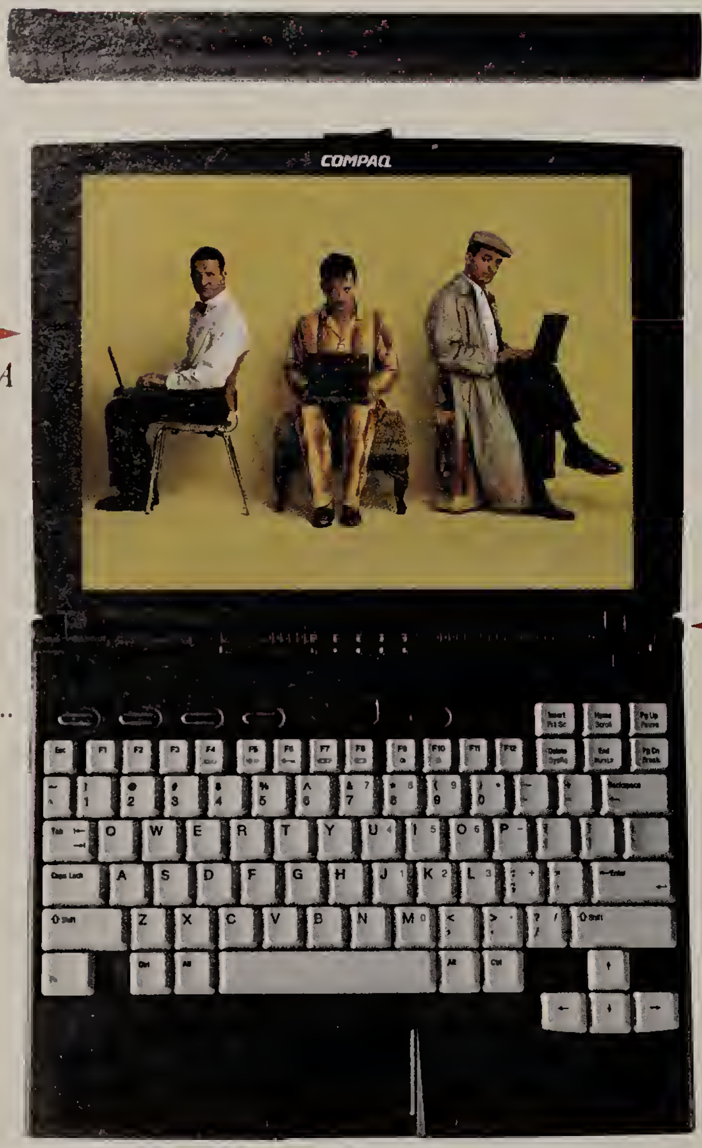
You can request a product survey to be included in the following Buyer's Guides:

- Web server administration tools: Oct. 28 (subject to change)
- Remote LAN access: Nov. 18
- Relational DBMS servers: Dec. 9

Send E-mail to Kathy Scott at kscott@nww.com with your name, vendor's name, telephone and fax numbers, and E-mail address.

configure 1

- Full-Function Notebook
- Lithium Ion Battery
- Internal Diskette Drive



Detachable lithium ion battery also functions as a handle and a keyboard tilt.

Choice of SVGA displays from 11.3" CSTN to 11.8" CTFT.

Up to 133 MHz Pentium® processor, hard drives up to 1 GB.

configure 2

- Multimedia
- CD-ROM
- 3 Lithium Ion Batteries
- 16-Bit Stereo Sound
- Dual Speakers
- NTSC/PAL TV Output

Dual speakers integrated in the CD base provide 16-bit stereo sound.

This base is detachable and houses the CD-ROM.

THE COMPAQ ARMADA 4100. IF IT'

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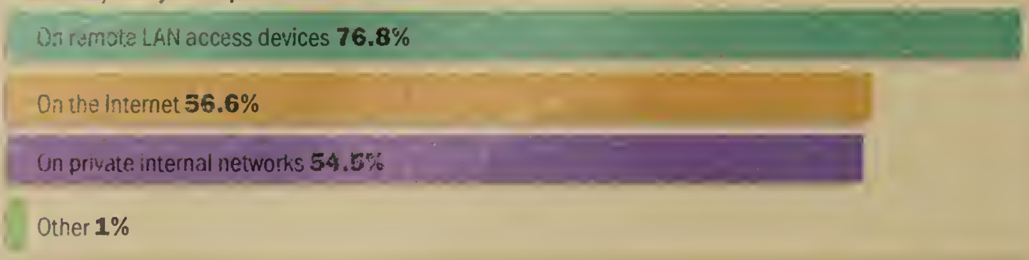
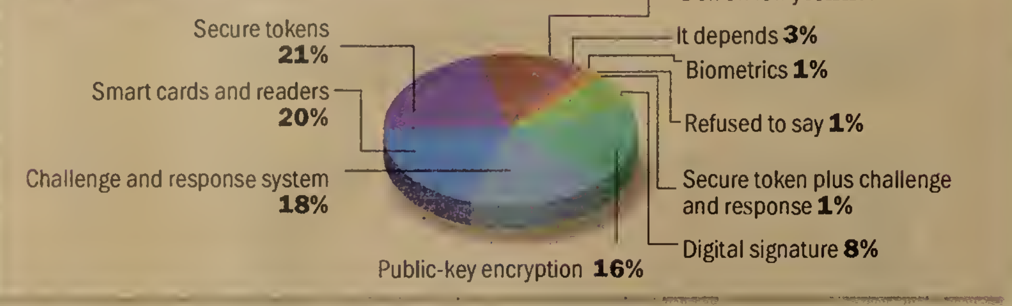
Has It Changed Your Life Yet?

Reader views on network authentication products

Based on 100 interviews



Where do/will you require authentication?



Which authentication technique do you prefer most?

Secure tokens

"We've had a good deal of experience with them, and we feel they're well established. We will, however, be actively looking at other options as they mature."

"The technology has been out longer, and it really works. It's not all smoke and mirrors."

Smart cards and readers

"I like its random selecting of passwords."

"I want something physical so that it's hard to duplicate."

A challenge and response system

"It is more secure and compatible with our remote access direction."

"It's easier to implement, and you don't need to buy any hardware."

Public-key encryption

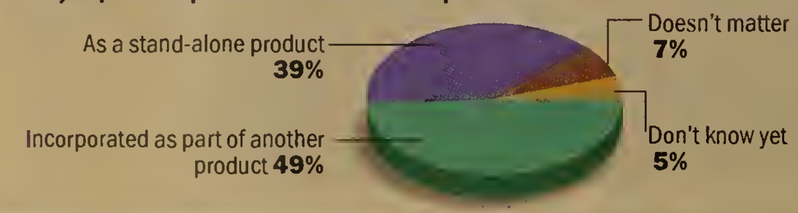
"It protects passwords."

"It's well understood, and it's reliable. Also, it's least susceptible to being forged."

Digital signature

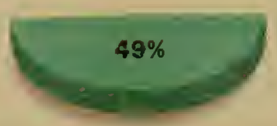
"It allows me to know where the source is coming from."

"It's the easiest to implement and manage."



How do you prefer to purchase authentication products?

Incorporated as part of another product



"I want minimal interoperability problems."

"It is already integrated, and the bugs should have been worked out."

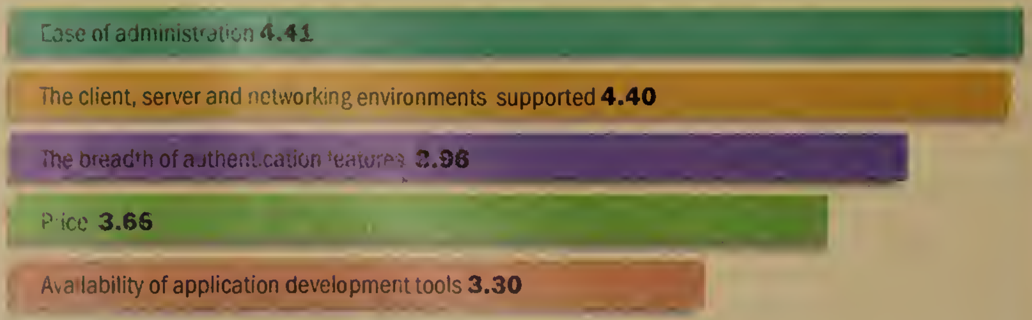
"You have one vendor to deal with on issues."

As a stand-alone product

"We like to do the integration ourselves."

"It will do a better job because it has a single purpose."

"You have more flexibility for specific applications."



How important are these features in selecting a network authentication product? (Highest score of 5)

The survey was conducted by Focus Data, an independent market research firm in Framingham, Mass., that gathers primary data concerning enterprise network environments and the needs of end users. To purchase full survey results, contact Mona Dabbon at (508) 626-2556 or mdabbon@focusdata.ultranet.com.

site to verify the digital signature on an E-mail message, or the certificate might be included with the message.

The CA can be a corporate officer for internal applications, a trusted third party such as VeriSign, Inc. or, if all goes as planned, the U.S. Postal Service (USPS). VeriSign became the first commercial issuer of X.509 public-key certificates and has issued more than 100,000 certificates as of July 1996. The USPS has announced plans to begin issuing public-key certificates in late 1996 for use in electronic commerce applications.

Typically, CAs form a hierarchy of trust, with each higher echelon vouching for and digitally signing the certificates of its immediately subordinate CAs. VeriSign, AT&T and Northern Telecom, Ltd. provide application tools for setting yourself up as a CA within a hierarchical structure and issuing X.509 certificates.

With VeriSign's Digital ID, you can create and manage public-key certificates that support digital signatures used in other vendors' applications. VeriSign provides the basic digital signature technology underlying many products — for example, Apple Computer, Inc.'s Macintosh OS 7.5, CompuServe, Inc.'s Internet Office WebServer, IBM's Internet Connection Server, Microsoft Corp.'s Internet Information Server, Netscape Communications Corp.'s Web server and browser products, Oracle Corp.'s WebServer 2.0, and Terisa Systems, Inc.'s SecureWeb tool kits.

ViaCrypt PGP, on the other hand, does not require a hierarchical CA structure. It operates under what's known as a web of trust, which means that peers authenticate each other. However, ViaCrypt will soon also support hierarchically organized third-party CAs.

One noteworthy business-oriented feature of ViaCrypt PGP is its ability to decrypt all encrypted messages either sent or received by an employee. The product can be set up to automatically encrypt all outgoing messages under a corporate key, and to require that employees use decryption keys certified by and in

An administrative capabilities Q&A

Network authentication products need to be managed as securely and effectively as your network. Here are some questions about administration tool capabilities with answers that provide a glimpse of which vendors support them.

Does the tool provide a graphical user interface?

A GUI is the norm today, with Windows and various flavors of Unix being the most popular ones. However, a few command-line interfaces endure.

Can it support centralized and distributed management?

Centralized, enterprisewide administration is also widely supported. Security Dynamics Technologies, Inc. and OpenVision Technologies, Inc. support distributed management by permitting multiple simultaneous administration sessions between local and remote personnel.

Will it streamline the initiation, management and renewal of user accounts and tokens?

Axent Technology, Inc. and ICL, Inc. enable you to define new users as part of a security group and be assigned the default privileges of their group.

Will it import data from existing security databases?

Products from Axent, CKS North America and ICL pull authentication data from existing storehouses such as IBM's Resource Access and Control Facility, Computer Associates International, Inc.'s TopSecret and Banyan Systems, Inc.'s StreetTalk.

Oracle Corp.'s Oracle Advanced Networking Options pulls data from enterprisewide directory services through Oracle Names, and provides native support for industry standard name services, including SunSoft, Inc.'s NIS/Yellow Pages, Banyan's StreetTalk, Novell, Inc.'s NetWare Directory Services, and the Cell Directory Services of the Open Software Foundation's Distributed Computing Environment. Devon Software Corp.'s KyberPass supports real-time access to X.509 certification authorities that use Northern Telecom, Inc.'s Entrust APIs.

Can it synchronize updates to those databases?

Axent's OmniGuard/Enterprise Signon automatically sends a message to each supported security database instructing each to add new users. CKS propagates updates to various administration products and security databases. ICL enables the security configuration of each local server, workstation and PC to be defined centrally and then propagated to local servers. AssureNet Pathways, Inc. supports automated database replication across its own distributed authentication servers.

Will the tool allow you to distribute authentication-processing loads across multiple servers and provide the ability to switch over to a backup when necessary?

Secure Computing Corp. supports concurrent processing, dynamic load balancing and mirroring among up to four fault-tolerant servers. OpenVision can back up databases automatically, restart authentication servers without human intervention, and run secondary servers to eliminate a single point of failure. AssureNet Pathways has the ability to back up authentication databases automatically, either in full or just on selected records.

—James Kobielus

the possession of the company.

Application development tools

Once you select an authentication product, you have to integrate it with your applications and networks. This makes the evaluation of vendor-supplied APIs and development tools critical.

The APIs enable you to make authentication features and services accessible from existing applications or to transform existing equipment into authentication clients that can query authentication servers for information. Some vendors go a step beyond APIs and provide sophisticated, cryptographic software development kits (SDK) and Dynamic Link Libraries (DLL). When evaluating cryptographic SDKs, make sure they support high-level programming languages that your developers are familiar with. Also be sure the tool kit enables you to build high-performance authentication capabilities that are integrated with your existing desktop and server environments. These should include the ability to import relevant data from existing corporate databases into the authentication server.

There is much more information on Network World Fusion, including:

- **A chart listing authentication techniques by product**
- **A glossary of authentication and security terms**
- **A description of how Kerberos works**

NetworkWorld Fusion

FIND IT ON 9907 FUSION

Type the above number in the DocFinder box.

AT&T's SDK includes a library of C language cryptographic APIs and linkable software modules for integrating digital signature authentication and other security algorithms into 32-bit Windows NT and 95 applications.

Security Dynamics, which recently acquired security powerhouse RSA Data Security, now offers RSA's industry-leading SDKs, including BSAFE 3.0 and Toolkit for Interoperable Privacy Enhanced Messaging. RSA's tool kits have been used to develop many commercial security products, including the security extensions in Windows 95, NetWare, Netscape Navigator, Lotus Notes and Oracle SQLNet.

CyberSafe Corp. and Nortel support the Generic Security Service (GSS) API defined in IETF RFC 1508. The GSS API supports the development of secure applications without the necessity of learning the architectures of back-end security services such as Kerberos, DCE and PKCS.

Calculate the risk

As the mass market for electronic commerce, workflow and other internetworking applications develops, so, too, will the demand for authentication. In the near future, sophisticated authentication capabilities, such as secure software tokens and digital signatures, are sure to be incorporated directly into most operating environments, applications, remote access products, messaging systems and Internet firewalls. It's not clear whether third-party authentication vendors can continue to prosper or remain independent as the major software vendors begin to embed such functions directly into their products the way that password protection has been built into many operating environments and applications.

Nevertheless, if you want to spoofproof your vulnerable corporate networks, start exploring today's commercial options and bone up on the raft of unfamiliar new technologies and standards. You don't need to be a mathematician to make sense of today's authentication market and the sophisticated algorithms that underlie it (though it couldn't hurt).

You do, however, need to calculate the potential business losses from hacked or stolen corporate passwords and other lax authentication practices. Then you will begin to appreciate the need for stronger mechanisms to guarantee the authenticity of every user, system, message, document and packet on your network.

Kobielus, a contributing editor to Network World, *is a senior telecommunications analyst with LCC, L.L.C., an Arlington, Va.-based network design and engineering firm. He can be reached at (703) 807-5075 or kobielus_james@lccinc.com.*

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Review

Continued from page 1

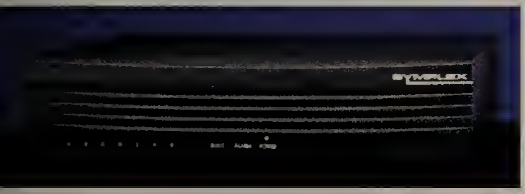
Plus and the Microcom, Inc. LANExpress fall short because of interoperability problems.

Performance is not an issue with any of these devices. During preliminary testing, we found the PPP throughput of the RAS devices to be similar, so we did not conduct any formal throughput testing.

Operation

While interoperability claims are commonplace, the truth is that PPP and Multilink PPP (MP) are relatively new protocols. Protocol implementations are still being worked out by the vendors' engineers. This can lead to interoperability problems — a significant shortcoming in a number of RAS devices.

The best that can be said of any RAS device is that it works properly and transparently. This was definitely the case with the Ascend Max 1800. Both our Cisco 751 brouter and U.S. Robotics Access Corp. ISDN card were able to connect, negotiate MP, authenticate Password Authentication Protocol (PAP) and Challenge Handshake Authentication Protocol (CHAP), and access the network. The Max 1800 supports not only ISDN, but also frame relay DSU/CSUs and analog modem connections.



Symplex's *DirectRoute DR-1*

The Cisco 4500, a full-blown high-end router with RAS capabilities and an SNMP MIB, also performed well. The Cisco brouter client and the U.S. Robotics ISDN card were able to connect and authenticate PAP or CHAP without difficulty. However, we did run into some operational issues. For example, there appears to be no way to determine how many users are accessing the 4500 and what channels are being used. A Basic Rate Interface port status command can be used to determine ISDN line statistics, but utilization is not included — a glaring shortcoming.

Major disadvantages for Microcom's LANexpress are its lack of support for MP and for connections from remote ISDN bridges or routers. Instead, the product is designed to support ISDN connections from terminal adapters only. LANexpress has slots for dual- or quad-modem cards, serial cards for external modems and terminal adapters, or an ISDN controller card. A maximum of four BRIs can be supported by the ISDN card.

We had no difficulty accessing the Network Express NE Link-1000 with either the Cisco brouter or the U.S. Robotics ISDN card. MP worked well, as did CHAP and PAP authentication. Operation was trouble-free. NE Link-1000 has ISDN status indicators for each line on the front panel.

Shiva's LanRover/E can be configured for static addressing (the remote PC already has a pre-assigned IP address). Otherwise, IP addresses can be assigned from an internal user list (the same user is assigned the same address every time he dials in) or from an IP address pool (a series of IP numbers that can be given out on an as-needed basis). In addition, addresses can be obtained through a dynamic host control protocol (DHCP) server. This flexible arrangement should meet the needs of a variety of remote users.

LanRover/E supports three authentication schemes automatically. When a call is received, the device first looks for Shiva's proprietary Shiva Password Access Protocol. Next, it checks for CHAP and then PAP. This enables the device to authenticate users running varying authentication protocols.

Shiva claims its LanRover/E Plus can accept as many as 250 virtual connections, though we doubt that many connections could be supported on a box with a maximum capacity of eight BRIs. It lacks a console port for direct management.

We had trouble getting the LanRover/E to accept calls from our remote devices. A Shiva support engineer who visited our site was able to get the LanRover/E to accept calls from another LanRover/E, but Shiva's implementation of PAP and CHAP authentication prevented the Cisco brouter from connecting.

With authentication turned off, we were able to place a call to the device from the Cisco brouter, but we were unable to pass any IP or IPX packets across the ISDN link. Shiva finally said the unit did not support either the Cisco brouter or the U.S. Robotics ISDN card.

Symplex DirectRoute DR-1 can connect as many as eight remote sites and provides up to 512K bit/sec throughput per site. It offers two RS-232 DB-25 serial ports for terminal adapter, DSU/CSU and other serial connections.

3Com's *AccessBuilder 4000*

Although the Symplex documentation indicates that its DR-1 supports PAP and CHAP, the Version 3.0304 software that Symplex supplied with the DR-1 did not support authentication. According to Symplex, the upcoming Release 4.0 will support CHAP and PAP authentication. We were able to successfully connect without authentication from both the Cisco brouter and the U.S. Robotics ISDN card.

The 3Com AccessBuilder 4000 handles authentication in much the same way as the Shiva LANRover/E Plus. It cascades down the possible authentication options, such as CHAP and PAP, until it either authenticates the user or disallows access. This is a plus because it allows different users using different authentication mechanisms to access the network. We had no difficulty connecting and authenticating with the U.S. Robotics cards or the Cisco brouter.

HOW WE DID IT

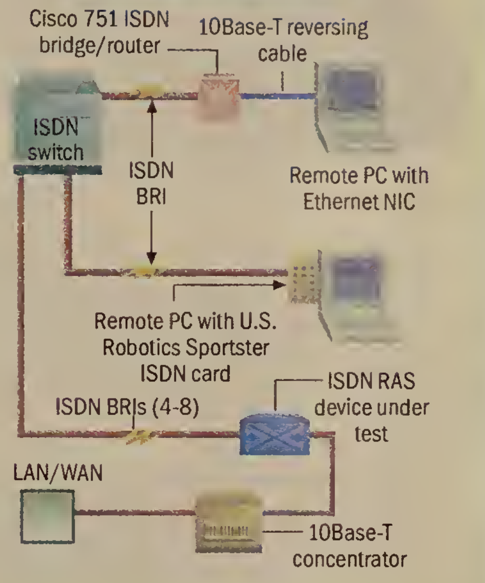
We asked vendors for RAS devices that were compatible with National ISDN 1 and supported:

- No less than four Basic Rate Interface ISDN lines (eight B channels)
- TCP/IP and IPX through transparent bridging or routing
- PPP and Multilink PPP (MP) protocols
- Password Access Protocol (PAP) or Challenge Handshake Access Protocol (CHAP) authentication

Each device was connected to an AT&T 5ESS-2000 running National ISDN 1 (see graphic). Four or eight ISDN lines were connected to the unit, depending on how many BRIs the device supported. A 10Base-T connection to an enterprise network enabled us to test interconnection to network resources and the Internet.

On the remote user side, we used a PC connected through a Cisco 751 ISDN bridge/router and a U.S. Robotics Sportster PC Card ISDN adapter. Each remote device dialed into the products under test using PPP or MP with PAP and CHAP authentication.

TEST CONFIGURATION


Cisco 751 ISDN bridge/router
10Base-T reversing cable
ISDN switch
ISDN BRI
Remote PC with Ethernet NIC
Remote PC with U.S. Robotics Sportster ISDN card
ISDN BRIs (4-8)
ISDN RAS device under test
LAN/WAN
10Base-T concentrator

The AccessBuilder 4000 includes an eight-port high-speed asynchronous module. The device can support a 16-port asynchronous module for modem connections or eight BRIs.

The AccessBuilder 4000 routes TCP/IP and IPX and bridges other protocols such as AppleTalk, NETBEUI and DECnet. MP is supported, as are Windows 95 Dial-up Networking and Windows NT workstation connectivity. For network management purposes, a Windows NT-based SNMP Trap Manager is included to compile device statistics. LEDs on the back panel indicate D-channel, B1- and B2-channel activity.

Installation

The overall quality of each of the products was generally reflected in our experience installing them. The Ascend Max 1800 was one of the easiest devices to install. It took only 90 minutes from a cold start to get the unit up and running. Although it took us a little longer to configure, we had no trouble setting up either the Network Express NE Link-1000 or the Symplex DR-1.

The Cisco 4500 CD-ROM installer supports Macintoshes and PCs. It worked fine, but when we installed the software on a PowerMac 8500, the installer insisted on giving us Mosaic, Adobe Type Manager and Adobe Acrobat. Although we appreciated the free software, we felt it presumptuous of Cisco to dump all that software on our hard drive — particularly when similar applications already existed.

We received two versions of Microcom's hardware. The first was a recent production version that we were unable to get working. Microcom suggested we install the latest version of its system software, but that rendered the unit inoperable, so it sent us an earlier version of the product. This unit, based on a chunky 486 PC, arrived with the cards unassembled. While assembly was not difficult, we were amazed to find no documentation on how to set up the Ethernet card.

Software installation was reasonably straightforward. The server defaults to 802.2 Ethernet frames. If you are running Ethernet Type II or some other Novell frame type, you must explicitly change the type specified in the PROTOCOL.INI file.

Ascend's Max 1800 *is the winner of our World Class Award, which is given to products that rate 9.0 or better on our scorecard.*

With the Shiva LanRover/E Plus, there was no indication in the documentation or on the device whether the ISDN interfaces were S/T (requiring an external NT-1) or U (no external NT-1 required.) These are important distinctions because the wiring and equipment required are completely different for the two interfaces, and you can't always tell by looking which is which; they both can use RJ-45 connectors. It turned out that we were sent S/T interfaces, but we had to call technical support to find that out.

3Com's installation requires the user have a telnet application installed. Usually, this is no problem since most administrators have access to TCP/IP applications, but it would be better for 3Com to provide ping and telnet utilities just in case.

Configuration

After installation, the next step is to configure the RAS. You configure the

Ascend Max 1800 through a semigraphical terminal session operated through VT-100 terminal emulation or telnet. While a true graphical user interface (GUI) would have been preferable, the terminal session does a credible job. Real-time device status is available in a separate window, no matter what part of the configuration screen is being displayed at the time. As a result, you always knows what the device is doing and how it is responding to configuration changes. The unit also includes SNMP support.

Cisco's *4500*

If you operate Cisco-based networks, you'll immediately recognize most of the 4500 command set. If not, you may be in trouble, for the Cisco command-line interface is complex and definitely not for the inexperienced. There is a prompted system that is intended to assist less experienced users in configuring the device, but it proved to be of little help.

In short, configuring the device was a nightmare. Our router specialist, who is quite conversant with the Cisco IOS, was completely stumped by the ISDN configuration. He required the assistance of two Cisco Technical Assistance Center engineers. Even so, it took them two days to get the unit working.

Microcom LANexpress can be configured with telnet, SNMP or ExpressWatch, a Windows-based console manager. Unfortunately, accessing frequently used options in ExpressWatch often requires navigating down multiple hierarchical menus, making it more complex than it should be.

We were surprised by some of the quirks in configuring the device. For example, configuration changes required rebooting the server, even if only to add a new user. This is extremely inconvenient and irritating since all active sessions are disrupted during the reboot.

The Network Express NE Link-1000 configuration is handled through a telnet command-line interface or by a PC running the Internode management software that is connected to the console port. Configuration was not difficult.

Because there is no connection for a console port, the Shiva LanRover/E must be managed over the network. While that's a nice feature, having a console port for direct device management is always a good idea. If something happens to the device's network connection, without a console port it is impossible to manage the device or tell what went wrong.

The device is managed using Windows or Macintosh GUI software that is provided with the unit. The Macintosh software was a different version (3.6) than the PC management software (4.0). But in at least one sense they were equal: We experienced problems with both.

The Macintosh software would crash with a "type one error" whenever a new or changed configuration was sent to the LanRover/E. The PC version, running under Windows 95, would crumble with an exception error. We discussed this with Shiva technical support, who had us turn off IPX in the Windows version and manage the LanRover/E entirely with TCP/IP. These seemed to fix the Windows 95 problem. Shiva was unable to tell us how to fix the Macintosh software.

DirectRoute can be configured through standard communications programs, SNMP or telnet. The management interface is menu-driven and reasonably easy to use.

AccessBuilder was no problem to configure. It has a menu-driven manager that was easy to use and intuitive.

Switch provisioning

The bane of ISDN is its configuration requirements. Every ISDN device must be configured for the ISDN line. These configurations, called switch provisioning, are often complex and intimidating. And if they're not done just right, it's likely the device won't operate properly, if at all. Therefore, the more information and assistance the vendor supplies in setting the ISDN parameters, the better.

Ascend understands this. The company supplies clear provisioning information for a number of ISDN switches. The information given for service provider ID (SPID) configuration was well presented and easy to interpret.

Microcom, Network Express, Symplex and 3Com also supplied good provisioning information.

Because there is no connection for a console port, the Shiva LanRover/E must be managed over the network. While that's a nice feature, having a console port for direct device management is always a good idea. If something happens to the device's network connection, without a console port, it is impossible to manage the device or tell what went wrong.

Likewise, we couldn't find switch provisioning information for Shiva's LanRover in the documentation, but it was on the Shiva Web site. Since no specific SPID

SCORECARD

		WORLD CLASS Max 1800	Cisco 4500	LANexpress	NE Link-1000	LanRover/E Plus	DirectRoute DR-1	AccessBuilder 4000
Overall score		9.5	6.1	5.4	8.4	5.4	7.2	8.4
Features	(20%)	9	7	7	8	7	7	9
Interoperability	(20%)	10	9	2	9	2	5	9
Ease of use	(20%)	9	6	7	9	7	9	9
Configuration	(10%)	10	1	6	8	5	9	7
Protocol support	(10%)	9	10	4	7	8	5	9
Installation	(10%)	10	5	4	9	7	9	8
Documentation	(10%)	10	1	8	8	2	7	6

Scores based on a scale of 1–10. Categories are weighted by the percentages shown.

NetResults

Product	**Max 1800**	**Cisco 4500**	**LANexpress**	**NE Link-1000**	**LanRover/E Plus**	**DirectRoute DR-1**	**AccessBuilder 4000**
Vendor	Ascend Communications, Inc. (800) 922-0199 (510) 769-6001 www.ascend.com	Cisco Systems, Inc. (800) 553-6387 (408) 526-4100 www.cisco.com	Microcom Systems, Inc. (800) 822-8224 (617) 551-1000 www.microcom.com	Network Express, Inc. (313) 761-5005 www.nei.com	Shiva Corp. (800) 977-4482 (508) 788-3061 www.shiva.com	Symplex Communications (313) 995-1555 www.symplex.com	3Com Corp. (408) 764-5000 www.3com.com
Price	$7,200	$19,900	$4,490	$4,995	$7,119	$3,799	$6,295
Ports	8 BRI, 1 AUI, 1 10Base-T, console	8 BRI, 2 AUI, 2 10Base-T, console, optional token ring	4 BRI, 1 AUI, 1 BNC, 1 10Base-T, token ring	4 BRI, 1 AUI/10Base-T, console	4 BRI, 1 AUI, 1 BNC, 1 10Base-T, token ring	4 BRI, 1 AUI/10Base-T, console	4 BRI, 1 AUI, 1 BNC, 1 10Base-T, console
Routing protocols supported	TCP/IP, IPX/SPX	TCP/IP, IPX/SPX	TCP/IP, IPX/SPX	TCP/IP	TCP/IP, IPX/SPX, AppleTalk	TCP/IP, IPX/SPX	TCP/IP, IPX/SPX
Pros	▲ Easy to configure ▲ Excellent documentation ▲ Good ISDN provisioning information	▲ Excellent protocol support ▲ Device is full-blown router ▲ Good interoperability ▲ Can be managed by SNMP	▲ Supports both Ethernet and token ring ▲ Windows-based management	▲ Easy installation ▲ Good ISDN information ▲ Trouble-free operation ▲ Can be managed by SNMP	▲ Good authentication scheme ▲ Flexible IP addressing ▲ GUI management interface	▲ Easy installation ▲ Good ISDN information ▲ Excellent ISDN support center	▲ Easy configuration ▲ Good authentication scheme
Cons	▼ Management is not a true GUI	▼ Difficult to configure ▼ Lacks ISDN provisioning information ▼ Weak documentation	▼ No Multilink PPP support ▼ Cannot accept calls from bridges or routers	▼ No IPX routing	▼ Poor documentation ▼ No console port ▼ Buggy management software ▼ Poor interoperability	▼ Does not support routing ▼ Does not support PAP or CHAP	▼ Telnet and ping not supplied

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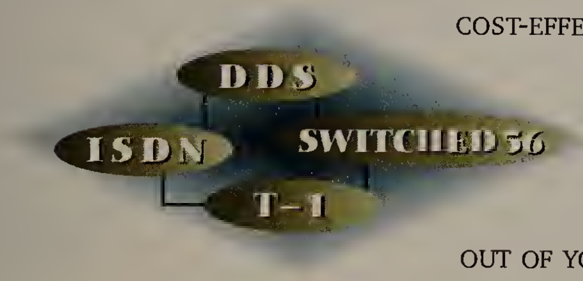

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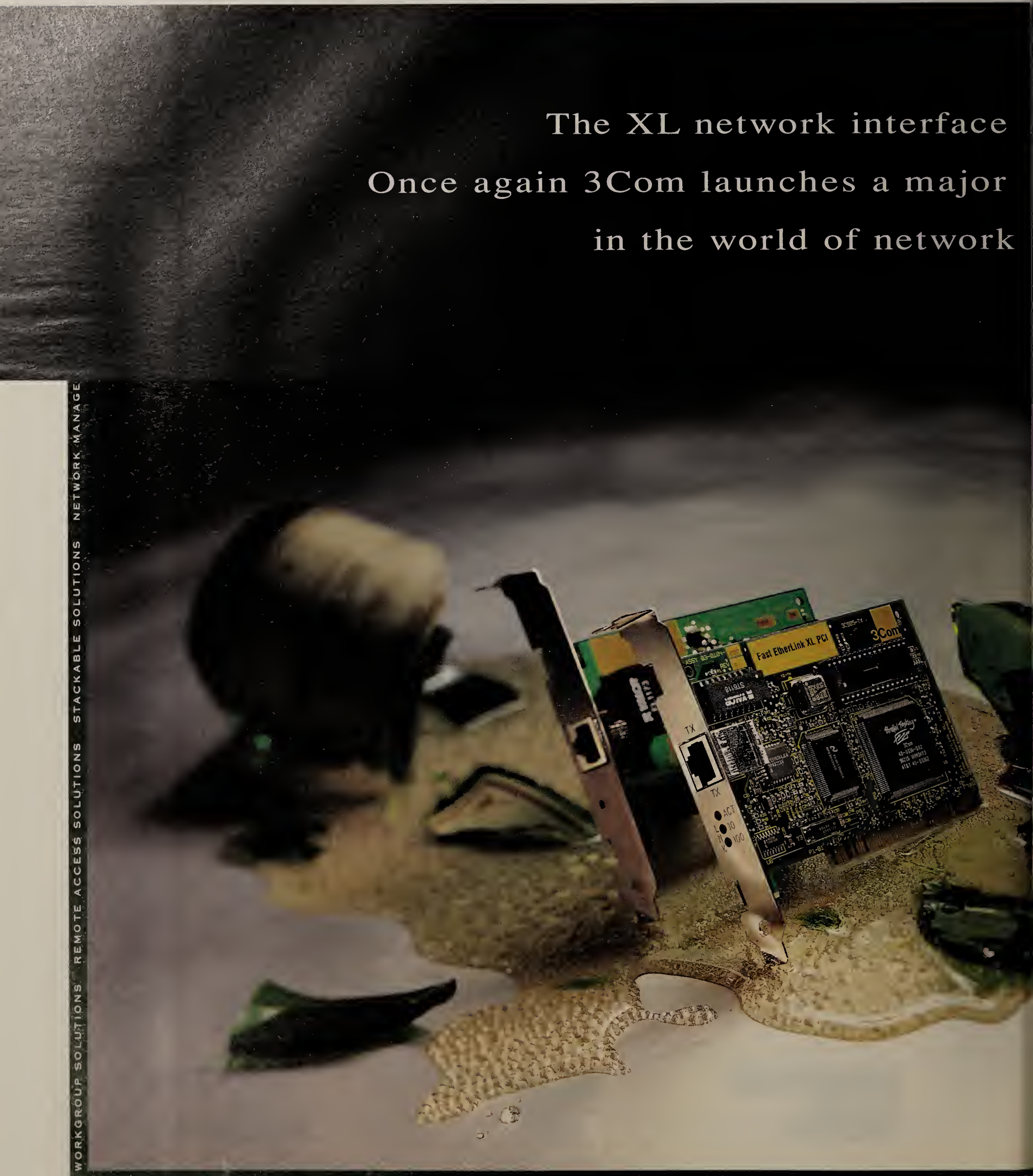
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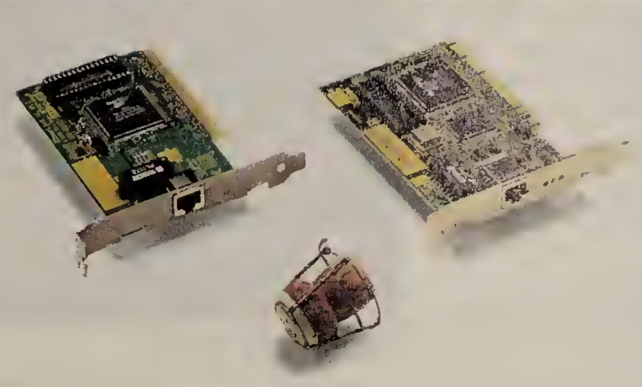

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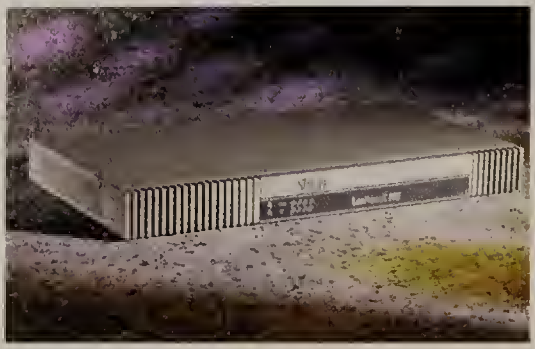
configuration information was provided, we were forced into a guessing game. Did the device want separate SPIDs for each channel, or the same SPID for both channels? We had no way of knowing because we never found anything on the Web site or the documentation to assist us.

Documentation

Besides a lack of provisioning information, there were other problems in some of the vendors' documentation. Cisco and Shiva were the worst offenders. Cisco provides very little printed documentation. The scant hardware installation guide offers only two sentences on ISDN. There is an errata sheet and a booklet for ordering printed documentation for an additional cost. Otherwise, information must be searched and printed from the CD-ROM or Cisco Web site. We found this lack of hard-copy documentation intolerable.


Shiva's *LanRover/E Plus*

The Shiva LanRover/E Plus comes with several diskettes and a CD-ROM. There is very little printed documentation. We found the CD-ROM interface and the search engine deficient. It often gave us irrelevant information when we searched for specific topics.

On the upside, the Ascend Max came with full printed documentation. CD-ROMs and Web sites are nice, but there's nothing like print media, especially with devices as complex as remote access servers.

See Network World Fusion for an interoperability matrix showing features and protocols supported by each vendor.

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This documentation was well organized and did an excellent job covering the device's operation and configuration. ISDN provisioning information was up front where it belongs. There was very little information that we could not find quickly due to the excellent indexing. Helpful ISDN troubleshooting information was included, as well.

The bottom lines

While configuration was hit or miss, with all devices, we were able to handle the Ethernet configurations without difficulty.

As some of the devices demonstrated, interoperability between multivendor devices is not always guaranteed. The results of our tests are contained in the interoperability matrix shown on Network World Fusion.

Over time, this problem should diminish; most vendors are serious about addressing interoperability issues. It's hard to go wrong with Ascend's Max 1800. Its rating of 9.5 wins it our World Class award. 3Com's AccessBuilder 4000 and Network Express's NE Link-1000 are also solid products worth a look.

At press time, Cabletron Systems was completing an acquisition of Network Express. It intends to redesign the NE Link-1000 and relaunch it as the Cabletron CyberSwitch CSX 1200.

The alliance is a co-operative of users, consultants, educators and integrators that applies its technical and business skills to analyze and compare strategic network products. A list of alliance partners can be found on page 43.

Fritz is chairman emeritus of the North American ISDN Users' Forum Enterprise Network Data Interconnectivity Family and the author of Remote LAN Access: A Guide for Networkers and the Rest of Us, *published by Manning Press/Prentice-Hall PTR. He can be reached at jfritz@wvu.edu.*

The author would like to thank Ralph Chapman and Bird Vilseck for their assistance in testing.

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INSTRUCTOR to teach advanced courses in compuer science and computer engineering at the College and with private companies that have contracted with the College; Core subjects include COBOL, RPG/400 and C/C++ programming on Windows NT workstations; Provide Novell Netware administration, including network connection, planning the network file systems, implementing login security, automating the workstation, creating login scripts, managing the Netware server and trouble-shooting the network; Setup and install all necessary software on the network; Set up the server protocol support of the Novell lab with the SCO-UNIX stations, and work with the Data Processing division to network these computer science labs with the IBM AS/400; Conduct stimulative research in virtual reality in conjunction with State, Federal and commercial organizations; Participate in departmental and college committees. Require: M.S. degree in Computer Science with two years of applicable teaching experience at the secondary or postsecondary level. Salary: $37,039 per academic year (nine months). Send resume to Mrs. Vergie Spears, Office of Personnel, Lawson State Community College, 3060 Wilson Road, SW, Birmingham, AL 35221. To ensure full consideration, the application deadline is September 30, 1996. However, applications will be received until position is filled. Lawson State Community College is an equal opporunity employer. Minorities and women are encouraged to apply.

Hardware Engineer (R&D)

Design electrical circuits, firmware & mechanical interfaces for existing & future small arms & supporting weapons simulators for marketing worldwide to police, coast guard, sporting & military agencies. Develop simulators for trainees to engage targets from decks of deployed ships. Design motion platform safety systems, evaluate hardware units & develop next generation computers. Perform real-time ballistic calculations based on target distance & flight time; use SPice, FILTECH, Matlab, OrCad, AutoCAD, Novell Perfect Office, MS-Access, MS-Windows & Assembly language. $42,583/yr. 40 hrs/wk. B.S. in Computer Eng. or Electrical Eng. & 2 yrs. exp. in job offered or 2 yrs. related exp. as Systems Engineer. 2 yrs. military exp. performing real-time ballistic/trajectory calculations & developing computer controlled target trainers accepted in lieu of 2 yrs. exp. as R&D Hardware Eng.or Systems Eng. Past exp. must include performing real-time ballistic/trajectory calculations & use of MS-Windows, MS-DOS, MS-Office & Assembly language. Submit resume or apply in person to the GA Dept. of Labor, 1535 Atkinson Rd., Lawrenceville, GA 30243-5601 or the nearest Dept. of Labor Field Service Office. Job Order #GA6019075.

Software Engineer

Implement hardware and software using DBCS for AS/400; develop application programs to meet customers' needs; develop interface of UNIX and AS/400. Bachelor's Degree in Systems Engineering +5 years experience in job offered or 5 years experience in related field of Computer Engineering & System Analysis. $45,650.00/year, 40 hour/week, 9:00 am to 6:00 pm. Require experience in IBM S/38, IBM AS/400, OS/400, RPG/400, DBCS Technique, Database Design and System Analysis. Knowledge of UNIX operating Systems and C language. Please send resume to: Job Service of Florida, 701 SW 27th Ave., Rm. 47, Miami, FL 33135-3014 RE: Job order #: FL-1469953.

U.S. Robotics intends to make the metaphor of a Global Community a reality. We are a billion-dollar company and the leading provider of end-to-end access solutions, from shirt pockets, laptops and desktops to corporate data centers. Recognized worldwide for our modems, we supply the systems that Internet service providers, online services and corporate data centers use to manage their remote access traffic. These accomplishments are only the beginning of our plan to revolutionize the way people and businesses communicate.

Global Blueprint: Success

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Senior Software Engineers - Packet Network Technology: The senior engineer with 7+ years experience developing X.25, Frame Relay or ATM products is right for this position by utilizing network access technologies. Experience with embedded, real-time "C" analysis and implementation a must. A background in a WAN hub environment essential. **(Job Code: SSEP)**

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Multimedia Systems Manager: Manage the development of embedded software for LAN, dial-up voice and video systems. Embedded software development experience and knowledge of "C" programming and real-time operating systems essential. Requires a BSEE/CS or related field and 10+ years industry experience. **(Job Code: MSM)**

Senior Software Engineers - X.75: Develop protocols in X.75 and embedded systems programming. Experience in ISDN or X.25 helpful. BSCS required, MSCS helpful. 5+ years experience and "C" programming skills essential. A background in IP router product development and full product life-cycle a must. **(Job Code: SSE-X75)**

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Locations: A global company, USR is headquartered in Skokie, Illinois, with offices and opportunities in Westborough, Massachusetts; Salt Lake City, Utah; Los Altos, California; Vienna, Virginia; Grass Valley, California; Milan, Italy; Munich, Germany; Dublin, Ireland; and subsidiaries in Lille, France and near London, Paris and other European cities.

Link Up To Our Website: www.usr.com

Network Services Opportunities

The Company	GE Network Services, a unit of GE Capital Technology Management Services, provides comprehensive network services which help our customers manage their technology assets and reduce their cost of ownership. Our Network Consulting Group supports all pre-sale efforts with technical presentations, opportunity assessments, bid/proposal development, performance analysis, and network/implementation planning. We currently have opportunities available nationwide.
Network Implementation Managers Program Managers Network Consultants	Qualified individuals will possess 5+ years' experience in the network industry; understanding of distributed network technology (Network Operating Systems, Standard Topologies & Protocol Suites, Client Software, Mail Systems, Databases, Hubs and Switches, Routers, WAN/CPE, Premise Distribution, Logical Designs, and Network Management); demonstrated ability to balance resources while maintaining flexibility and quality as well as ability to manage customer satisfaction and resolve critical issues; and excellent communication and interpersonal skills.
Contact and Benefits	We offer a competitive salary and excellent benefits package. For confidential consideration, please send, fax or e-mail resume, indicating position of interest on envelope and resume, to: **Fred Parlato, GE Technology Management Services, Dept. NW, 6875 Jimmy Carter Blvd., Suite 3200, Norcross, GA 30071; FAX: (770) 246-6439; E-mail: gectms.fparlato@capital.ge.com** (ASCII text format only!). No phone calls or agencies, please! Due to response volume, we are unable to acknowledge each inquiry.

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COTF COMPUTER NETWORK POSITIONS

The NASA Classroom of the Future (COTF) program at Wheeling Jesuit University (WJU) is seeking two highly skilled individuals to provide expertise and technical skills in advanced computer and telecommunications technologies. Both positions provide technical assistance and training to staff and users of software products produced by COTF; investigate and resolve software and hardware problems; and maintain inventories and maintenance schedules. Additional information is listed in the "staff" section of COTF homepage at address: http://www.cotf.edu/

MANAGER, COMPUTER NETWORK SERVICES

Responsible for maintaining the computer network and managing the computer services group. Duties include maintaining the ATM and ethernet network; maintaining WAN connectivity; managing workstations, Groupware, Novell and Unix servers; and coordinating procurement and installation. Master's degree in computer science, electrical (computer engineering emphasis) or computer engineering, or equivalent required.

COMPUTER SUPPORT ANALYST (HELP DESK)

Responsible for staffing and managing the COTF help desk. Duties include maintaining the help desk for multimedia products developed by COTF, and assisting with installation of hardware and software. Bachelor's degree in computer science, electrical or computer engineering, or equivalent required.

A review of applications for both positions will begin on September 30,1996, and continue until filled. Send letter of application, resume, and current references to Susan Tate, Director of Human Resources, Wheeling Jesuit University, 316 Washington Ave., Wheeling, WV 26003. AA/EOE

COMPUTER ANALYST: Applicant will analyze computer equipment needs of Russian (CIS) clients with regards to hardware and software upgrades. Based on clients business, will assess needs to interface modern equipment with outdated hardware and software. Will develop systems, picking from a variety of hardware and software available in the United States. Will oversee or assist in installation and implementation of system. Must have working knowledge of the monetary system in the former USSR now known as CIS. Need working knowledge and experience in import/export laws of the Ukraine and Russia. Must be fluent in the Russian language particularly in technical computer language. Must have B.S. in Computer Science and 1 year experience. In Berthound, Colorado. Must have legal authority to work in the U.S. Hours and Salary: 8am-5pm, Mon-Fri - $40,000/yr. Apply by resume to: COLORADO Department of Labor and Employment, Attn: Jim Shimada, Tower 2, Suite 400, 1515 Arapahoe Street, Ste 400, Denver, CO 80202, Refer to Job Order No: CO4492587.

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While other companies are selling legacy hardware, **MAXNET** evaluates, deploys and supports emerging network technologies from multiple manufacturers, and builds the most advanced network systems available for our customers. **MAXNET's** product and service offering evolves with technology. Our sales and engineering teams continually expand their expertise to build and support progressive network systems.

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- **Engineering-driven company**
- **Focus on customer service**
- **Highest-level manufacturer certifications**
- **Nationwide customer base**

MAXNET's core technology focus includes: LANs/WANs/MANs, ATM, SNA, Frame Relay, Remote Access and LAN Switching

MAXNET is seeking talented people with the vision to market and support next-generation network systems.

NETWORK SYSTEMS SALES

Experienced sales professionals needed to sell networking products and services. Rapid growth demands expansion in our New York, Washington D.C., Atlanta, Boston and Florida territories. Previous systems sales preferred, along with excellent written communication and presentation skills. Base salary plus performance incentives make your earnings unlimited.

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Both pre- and post-sales positions available in Charlotte, Washington D.C., Atlanta, New York, Boston and existing offices along the east coast. Both require 3+ years experience in pre/post-sale support role for enterprise networks, and expertise in LANs/WANs/MANs, ATM, SNA, Frame Relay, Remote Access and LAN Switching. Presentation and writing skills are a MUST. Project management experience is a plus.

Qualified applicants, please send resume to **MAXNET, Dept. NW-EY, 225 East Dania Beach Blvd., Dania, Florida 33004. EOE.**

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- Unix - SunNet Manager, HP OpenView, Cabletron Spectrum

NETWORK SECURITY ENGINEERS
- Security assessments and solution implementations (Unix and NT)

HELP DESK ARCHITECTS
- Analysis and solution customization (Remedy, Software Artistry)

CLIENT/SERVER SOFTWARE DEVELOPERS
- Object-oriented design and development
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SYSTEMS ARCHITECTS
- Migration of systems from legacy to client/server environments
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E-mail: recruiting@ssds.com

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INSTRUCTOR to teach advanced courses in compuer science and computer engineering at the College and with private companies that have contracted with the College; Core subjects include COBOL, RPG/400 and C/C++ programming on Windows NT workstations; Provide Novell Netware administration, including network connection, planning the network file systems, implementing login security, automating the workstation, creating login scripts, managing the Netware server and trouble-shooting the network; Setup and install all necessary software on the network; Set up the server protocol support of the Novell lab with the SCO-UNIX stations, and work with the Data Processing division to network these computer science labs with the IBM AS/400; Conduct stimulative research in virtual reality in conjunction with State, Federal and commercial organizations; Participate in departmental and college committees. Require: M.S. degree in Computer Science with two years of applicable teaching experience at the secondary or postsecondary level. Salary: $37,039 per academic year (nine months). Send resume to Mrs. Vergie Spears, Office of Personnel, Lawson State Community College, 3060 Wilson Road, SW, Birmingham, AL 35221. To ensure full consideration, the application deadline is September 30, 1996. However, applications will be received until position is filled. Lawson State Community College is an equal opporunity employer. Minorities and women are encouraged to apply.

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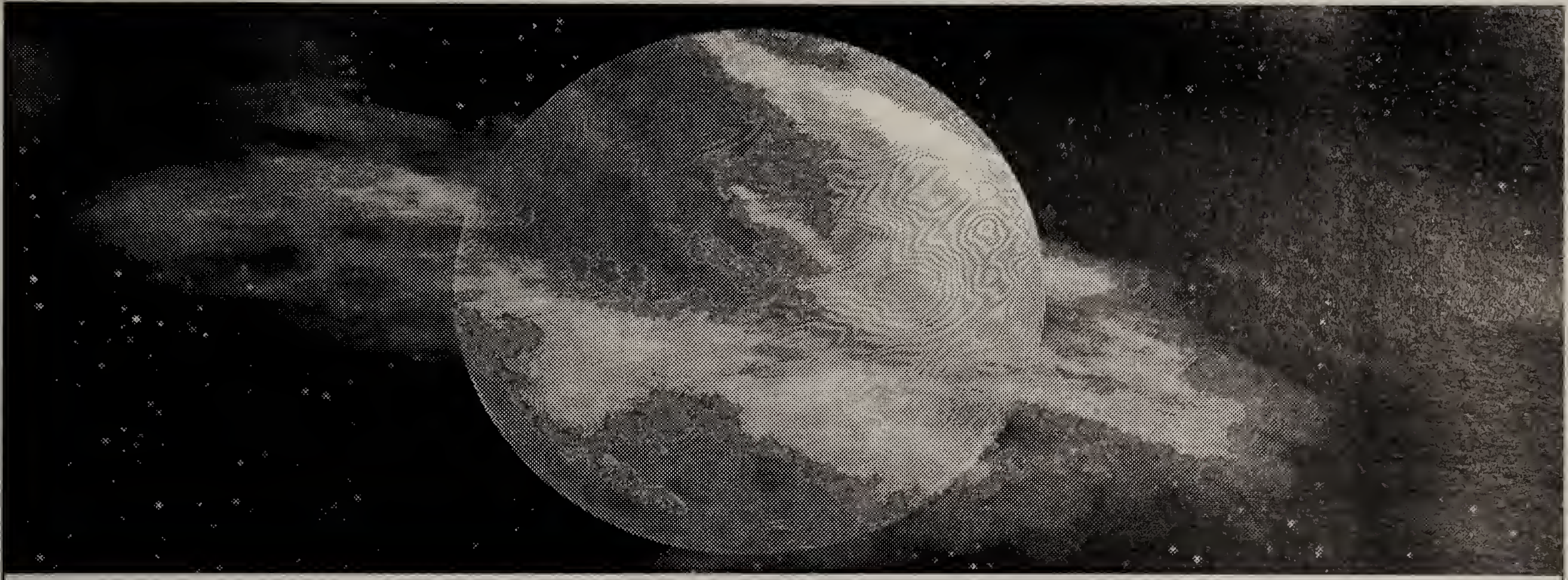

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Give your career a global plan for achievement. As we challenge your professional abilities and reward your personal contributions, we offer excellent salaries, continuous learning opportunities, benefits featuring a 401k plan, bonus programs and a casual workplace. **Send/fax/e-mail your resume, complete with salary requirements, in confidence to: U.S. Robotics, Network Systems Division, Human Resources, Attn: (NW/JP - Job Code), 8100 N. McCormick, Skokie, IL 60076. Fax: (847) 676-6662. e-mail: jpappas@usr.com.** U.S. Robotics is an equal opportunity employer rich in diversity.

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- Hardware Design Project Engineer

Sales/Service/Marketing

- Director, Field Engineering
- Systems Engineers
- Product Marketing Manager
- Customer Support Consultant
- Account Managers

Operations

- Materials/Logistics Manager
- Supplier Quality Engineer
- Test Engineer
- Materials & Traffic Support

All positions require previous experience in the communications arena.

To apply for these positions, please send your resume **INDICATING POSITION TITLE OF INTEREST AND JOB CODE I00918** to: Com21 Inc, 750 Tasman Dr., Milpitas, CA 95035. Fax: (408) 953-9299 or e-mail: sjm_res@com21.com (ASCII only). Or call our Job Hotline at (408) 953-9268. EOE.

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Researches new products and determines what new services might be applicable to the network environment. Requirements include: extensive experience designing, installing and supporting multiple router based WAN; broad knowledge of various test equipment including Data Scopes, LAN/WAN Sniffers, Beta Testers, T1 test sets, Diagnostic Systems; broad knowledge of various protocols such as TCP/IP, Unix Operating System, routing protocols, phone company transmission system (i.e. 56KB to T1). International experience with the European PTT international vendors preferred. Must be able to travel up to 40% internationally.

SS7 Network Engineer

This position will be responsible for planning, designing, and implementing a CCS/SS7 interconnection link between PageNet and wireline networks. Requirements include minimum of 5 years experience designing interconnection to a CCS/SS7 network, including equipment requirements, and interfaces to the Public Switched Telephone Network (PSTN); proven ability to coordinate with vendors in developing and implementing CCS/SS7 programs; experience negotiating with wireline telephone network companies regarding the terms and conditions for CCS/SS7 interconnections agreements; experience in AIN business development. The ideal candidate will also be able to interact with all levels and possibly assume a leadership role as well. Bachelor's degree in Engineering or related field required.

Interconnection Executive

This position requires extensive telecommunications experience with heavy emphasis in interconnection; knowledge of public switched telephone networks (PSTN) and co-carrier companies and their interconnection to PSTN. Understanding of regulatory environments and the ability to deal with various regulatory entities such as PUC, FCC and LECs. Must be an exceptional negotiator.

Capacity Planning Engineer

Requirements include: 2-4 years experience in telecommunications with a minimum of one year experience performing traffic planning and/or calculating capacity and recommending optimization. Experience in calculating or modeling wireless capacity preferred. EXCEL spreadsheet experience preferred. BS in Electrical Engineering, Industrial Engineering, or Computer Sciences desired along with very strong mathematical skills.

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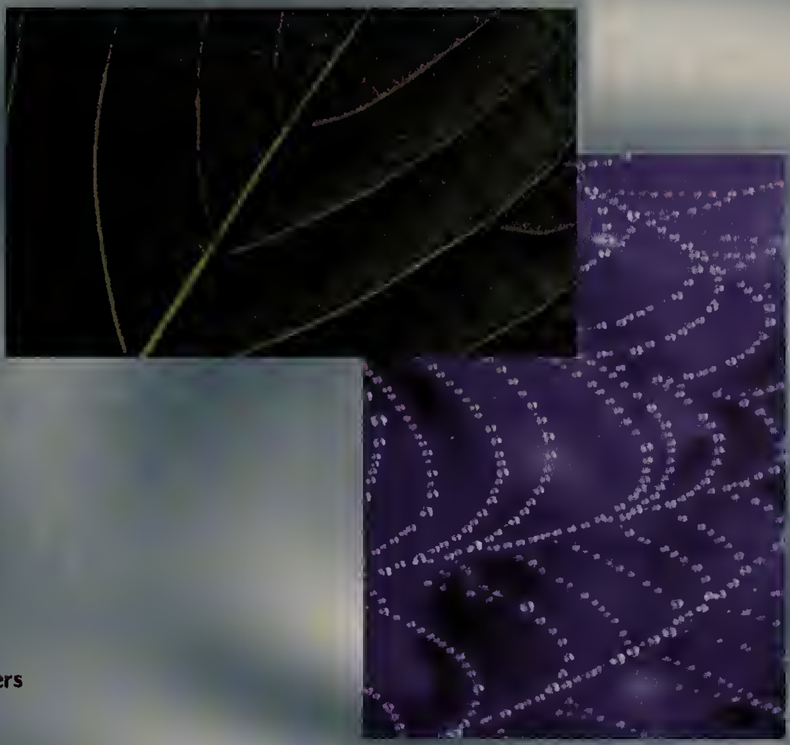

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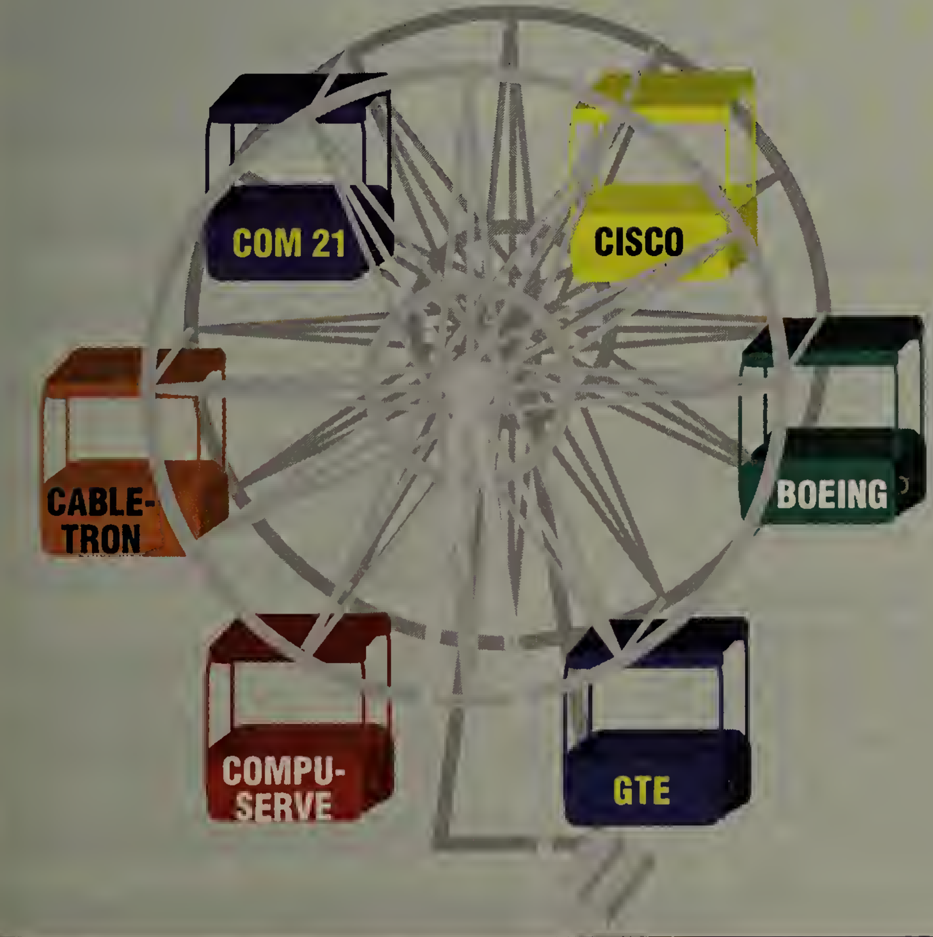

While attending NetWorld+Interop '96 Atlanta, drop by the Network World sponsored Career Fair. The Fair is located directly off the exhibit floor. Hours are from 10-6 Wednesday, September 18th and Thursday September 19th. 10-4 on Friday, September 20th.

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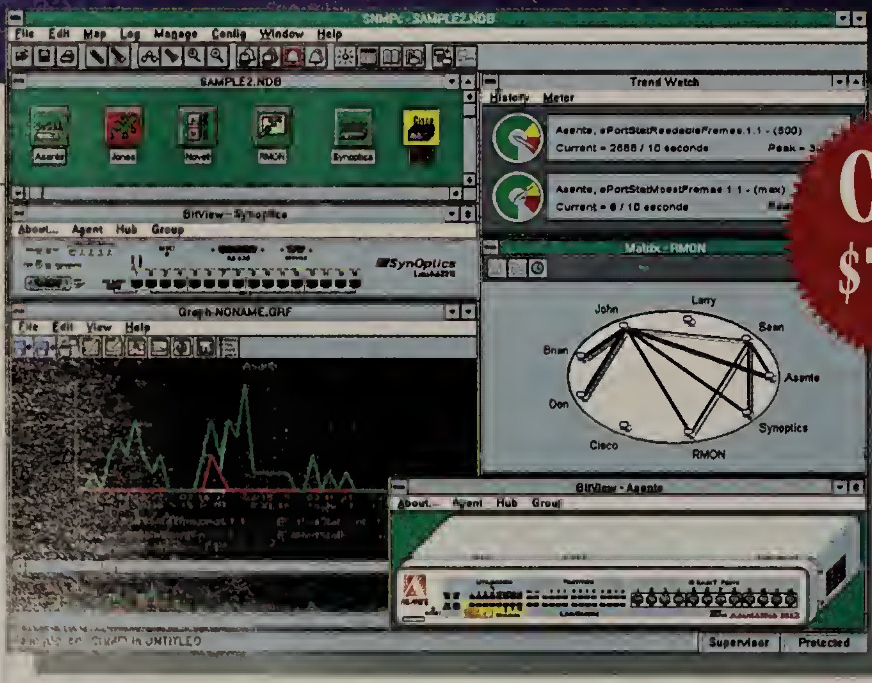

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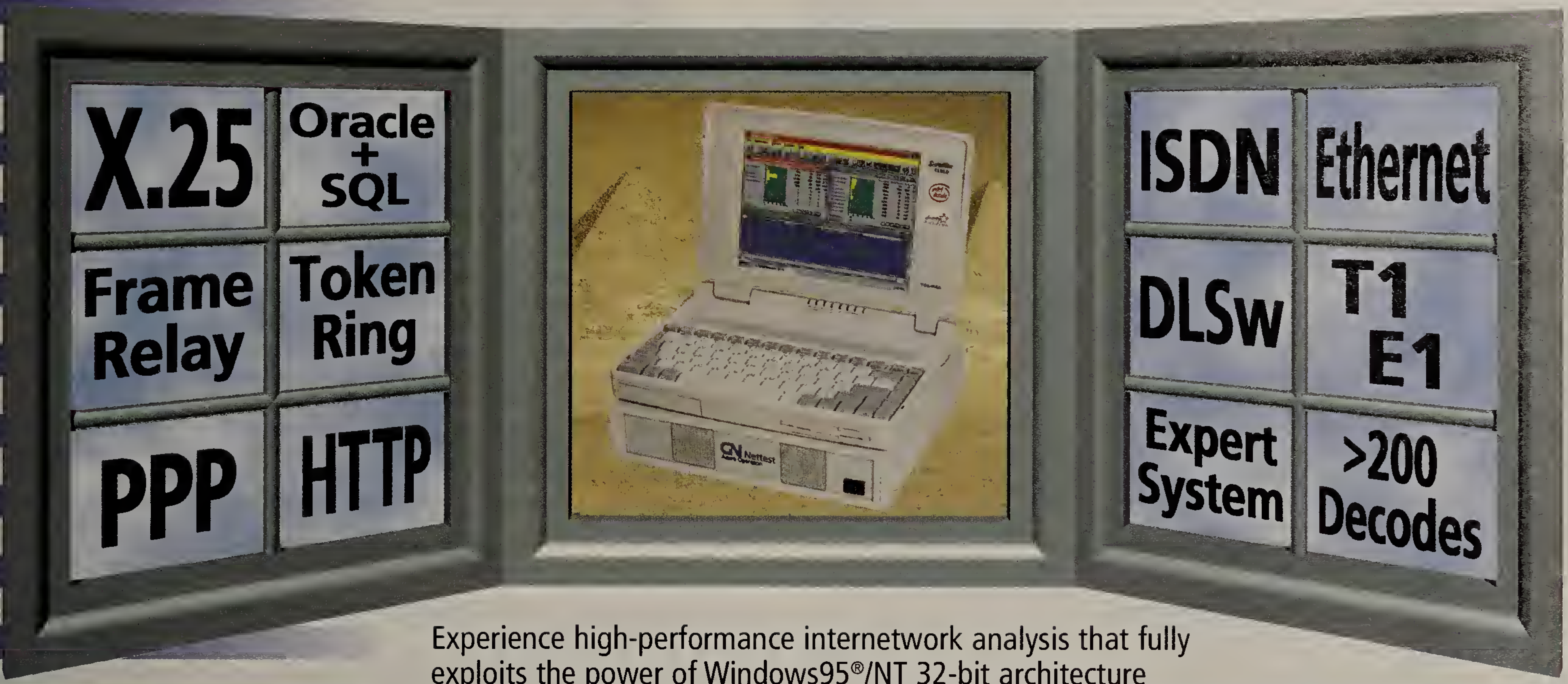

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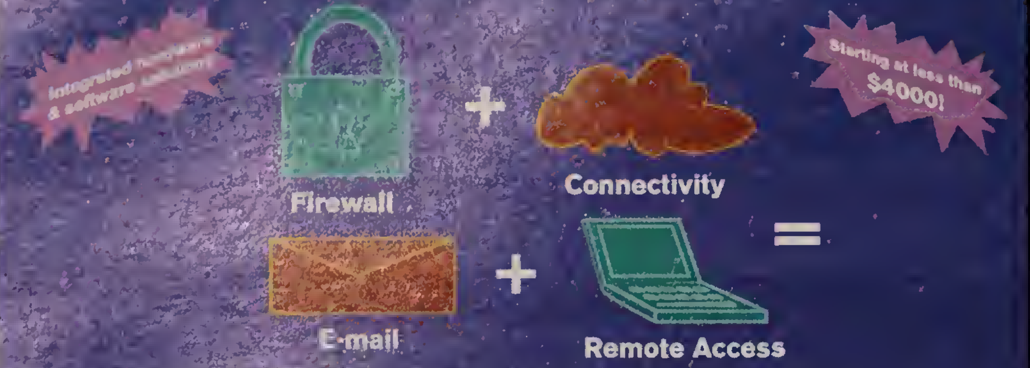
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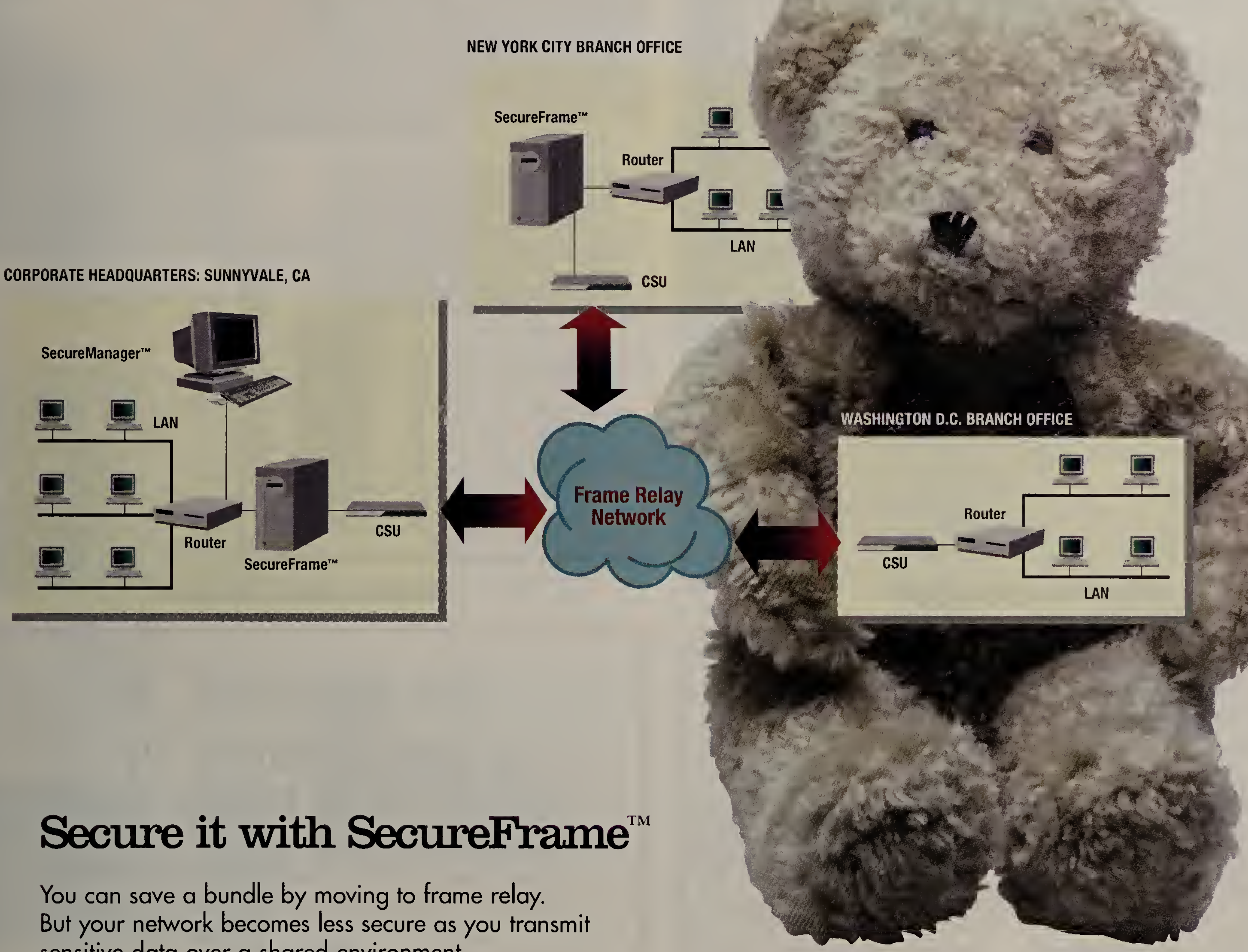
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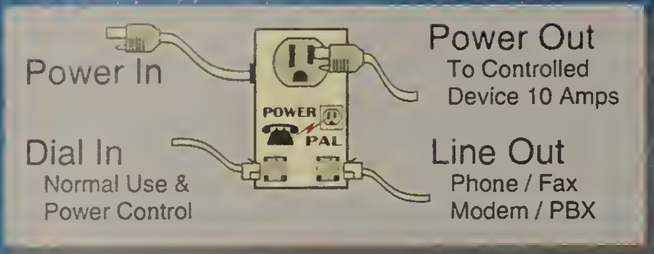

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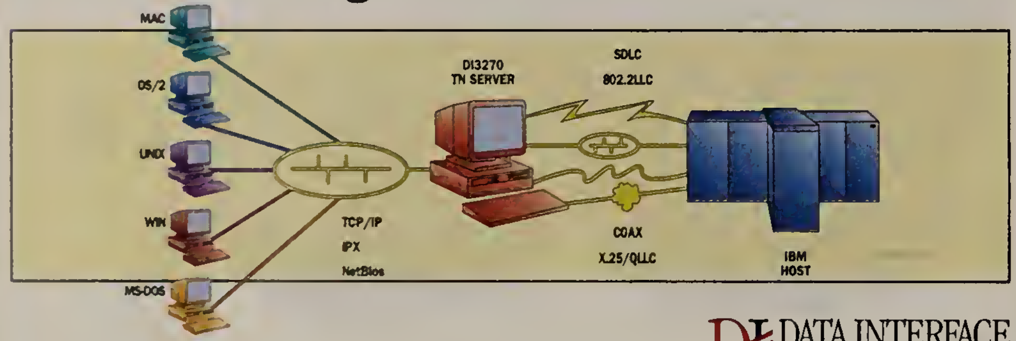

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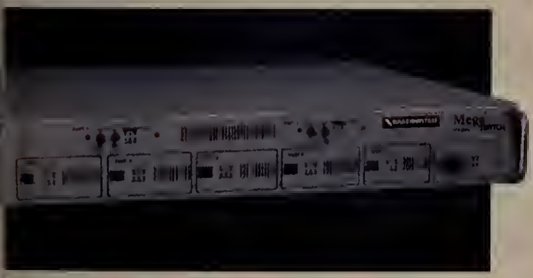

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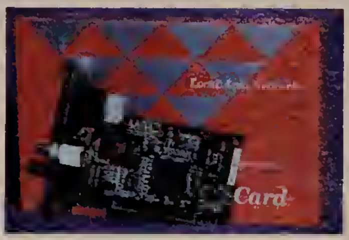

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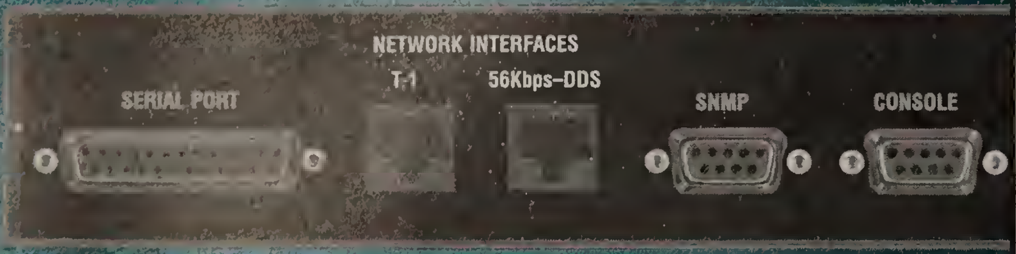

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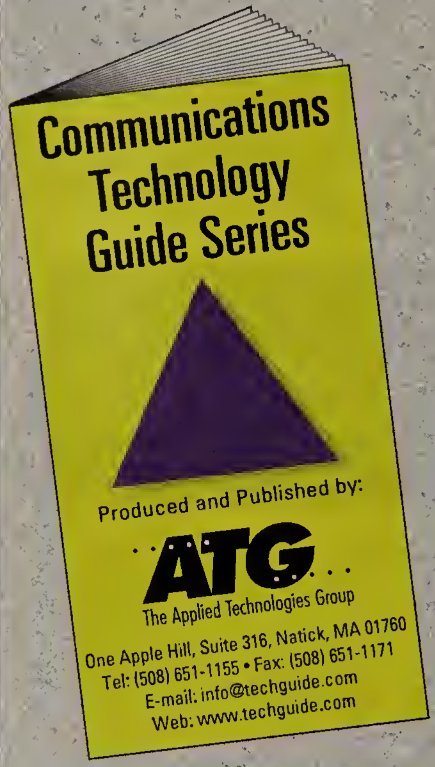

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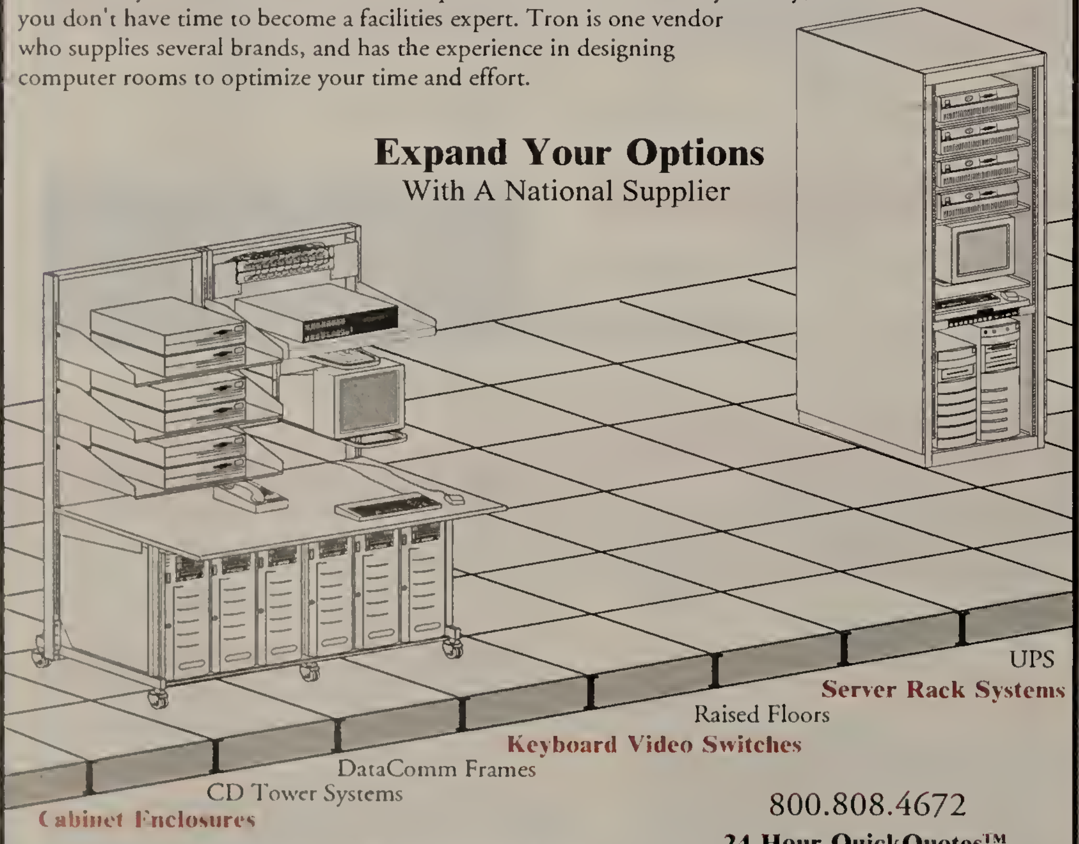

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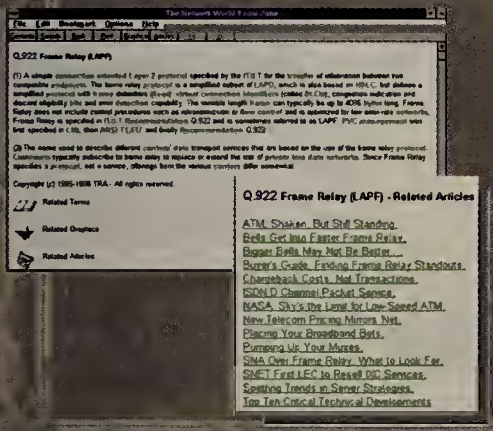

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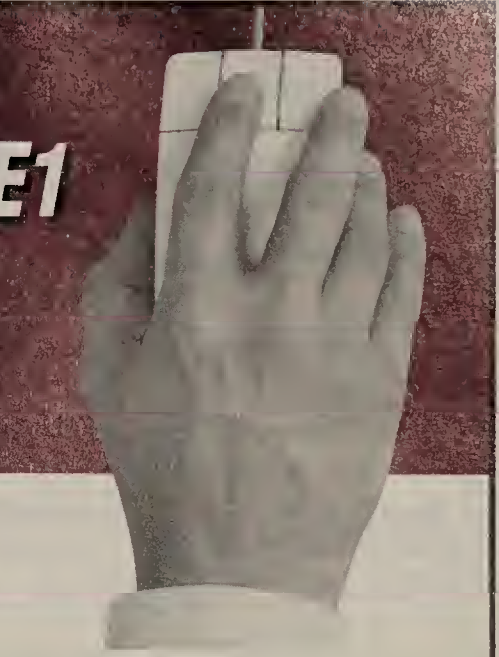

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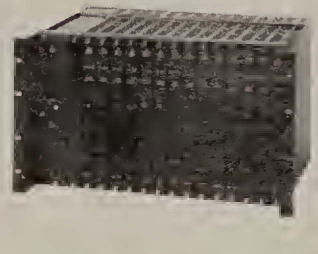

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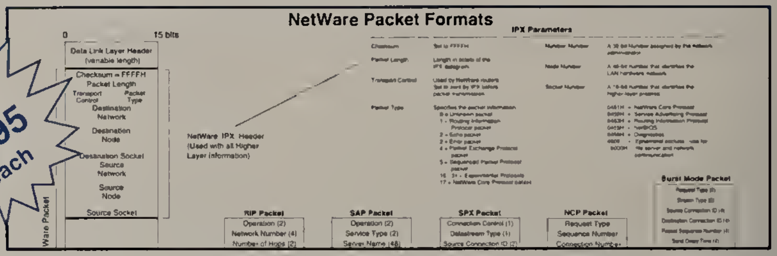

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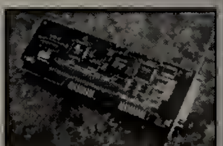

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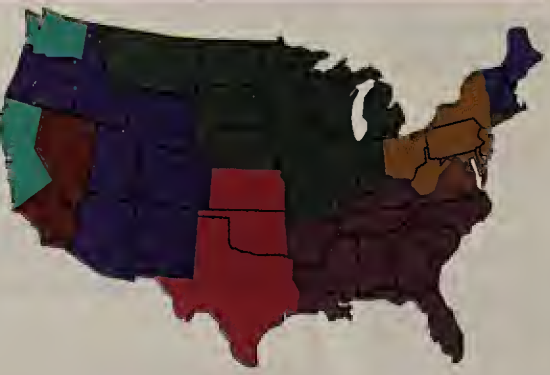

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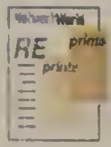

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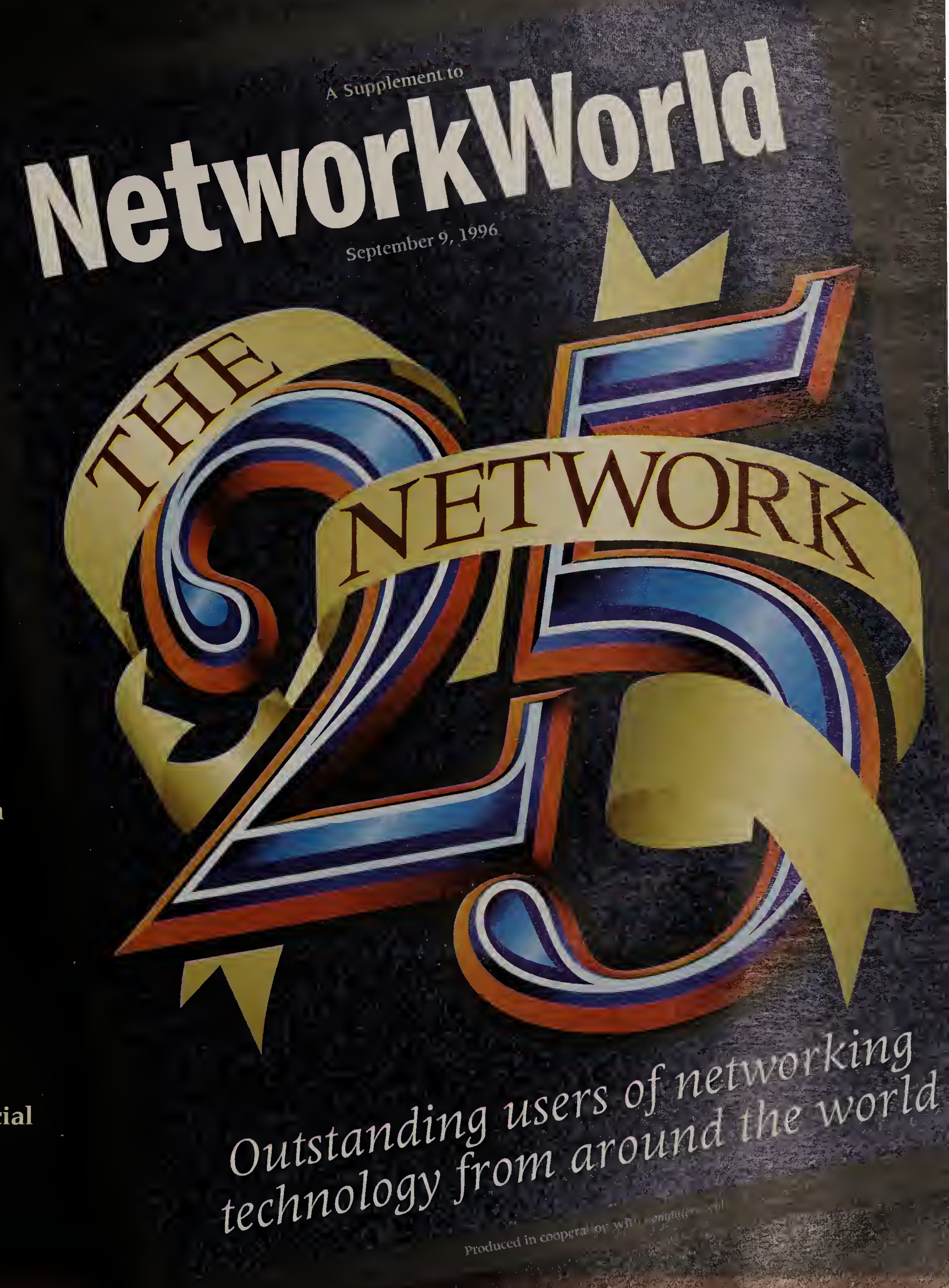
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Lotus

Continued from page 1

Lotus confirmed it is unveiling the applications this week but declined to provide specifics.

Lotus Internet Applications — which will be rolled out at the Internet Commerce Expo here — are seen as an important element to Lotus' plan to push its Notes/HTTP server hybrid as an alternative to traditional Web servers. Domino, which requires a Notes server, has been available for free since August.

"Rolling out plug-and-play software that leverages Notes and the Web is the way to go," said Gary Rowe, principal in the Atlanta office of Rapport Communication, a consultancy and market research firm. Hand-coding the functionality that will be available in the Internet applications would be extremely time-consuming, Rowe said.

Lotus began talking about add-on Internet applications to streamline the creation of core business tasks even before Domino was baked. At the time, Lotus dubbed them eApps, and they have subsequently been referred to as Net.Apps.

Given that the new Lotus Internet Applications are based on Domino, they may be accessed using Notes clients or Web browsers and will exploit Domino's security and replication.

Application rollouts

The first Internet application to appear, Net.Action, will include templates for constructing a Web site and online databases. It will be included free with Notes Release 4.5, expected later this year.

The three other applications in the suite will not be free, sources close to the plan said. They are expected to enter beta testing in the fourth quarter and ship shortly thereafter, sources said.

They include Net.Marketing, which adds an electronic commerce component to Domino by collecting information about a Web site audience, taking orders, processing approvals and authorizing payments. Net.Marketing will have links to IBM's Net.Commerce Web-based merchant system, sources said.

Another application, Net.Service, will work with Internet phones and allow companies to build Web-based customer service applications.

In the intranet environment, Net.Service applications are expected to take the pressure off internal help desks and provide links to back-end documentation libraries.

Finally, an application dubbed Indigo and based on the 'Net broadcast technology developed by PointCast, Inc. will be aimed at delivering external news and internal communications to desktops across the enterprise.

Early adopters of Domino applauded the plan.

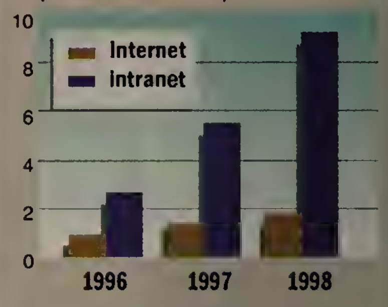
"Lotus is making it a priority to make Notes [and Domino] easier to use," said V.A. Shiva, president and chief executive officer at Millennium Productions, a Cambridge, Mass.-based developer that is using Domino as the basis for several Web sites.

The addition of the Lotus Internet Applications means customers can build electronic commerce applications around Domino without a stable of programmers, according to Shiva. In the absence of such capabilities, Shiva recently built a Domino-based Web site but chose to incorporate software from Open Market, Inc. to tack on electronic commerce features. ■

WORLDWIDE REVENUE FOR WEB SERVERS

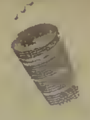
Lotus hopes to garner a substantial chunk of the burgeoning market with its Domino offering.

(In billions of dollars)



SOURCE: ZONA RESEARCH, REDWOOD CITY, CALIF

LOTUS INTERNET APPLICATIONS

	Application	What it does
	NetAction	Quickly creates a home page and a Web-based database
	Net.Marketing	Builds document libraries, catalogs and electronic stores
	Net.Service	Creates Web-based customer service applications that support Internet phones
	Indigo	Develops applications that combine external news and internal data; based on the 'Net news broadcast technology from PointCast

---

IBM buys further into electronic commerce

By Ellen Messmer
San Francisco

IBM last week unveiled a family of products and services under the CommercePoint label to help companies do business with suppliers electronically.

CommercePoint, a label stuck on everything from IBM's Commerce Server to new electronic catalog software, represents a concerted push by IBM to be the systems integrator of choice in the area of interactive Web communications for business.

And this week, IBM will get a vote of confidence from about 20 banks announcing they have picked Big Blue to host a Web site for them under the banner of the Inet Banking Consortium.

IBM's *Salnoske*

The consortium Web site will let users access bank accounts and pay utility or credit card bills via the IBM Global Network. This could pit IBM against CheckFree Corp., which holds 65% of the bill-payment market.

Last week's CommercePoint product rollout focused on a suite of customizable electronic catalog applications, called World Purchasing, for use by employees buying items for corporate use. The suite is offered for Lotus Development Corp.'s Notes and Web servers.

After skimming through vendor catalogs online with a browser or Notes client, an employee can fill out a purchase request, which is then routed to a purchasing manager for approval. Managers can digitally sign off on a procurement request with a public-key digital certificate, said Karl Salnoske, IBM general manager for Internet applications. Under a service it calls net.registry, IBM will help companies set up X.509 certificate management services, based on Northern Telecom, Inc.'s Entrust software.

Once the purchase order is approved, it can be processed as an X12 electronic data interchange order for the vendor, and dispatched over a value-added network or the Internet. Alternatively, it can be sent as E-mail or a fax to the vendor, Salnoske added.

A second software suite, called World Purchasing Pro, is offered as either a Web- or Notes-based application for procurement officers at large organizations with full-time buying responsibilities. IBM expects it to cost about $5,000.

IBM is also setting up World Distributor as a kind of electronic mall for business-to-business trading. IBM will focus squarely on getting electronic catalogs up with 800 numbers for buying.

The World Distributor site will have online purchasing, too, most likely using digital certificates to authenticate buyer identities. World Distributor will be similar in concept to IBM's World Avenue electronic mall for consumers, which is anchored by retailer Express.

Salnoske acknowledged that World Distributor will put IBM in competition with industry.net, a Web site used by firms selling mostly heavy industry equipment and services, now headed by former Lotus chief Jim Manzi.

In all its electronic commerce products, IBM is embedding software for handling credit card transactions according to the new Visa International, Inc./MasterCard International, Inc. industry standard called Secure Electronic Transactions. ■

Cisco

Continued from page 1

telligence to participate in Tag Switching, he said.

The intent of Tag Switching is to increase the packets per second through routers and switches and slash a QoS-based path through the carrier cloud that avoids the latency of router hops, sources said. This path would originate and terminate in routers at the edge of the network and pass through routers or switches within the network, they said.

"All they're saying here is, 'We'll give you some physical integration instead of buying yet another stand-alone box.'"

Tag Switching can work over a variety of media and WAN links, including frame relay and ATM, sources said.

Cisco spokespeople declined comment but confirmed that an announcement is scheduled for Sept. 16.

Cisco's Tag Switching protocol is analogous to Ipsilon's Generic Switch Management Protocol (GSMP) and Flow Management Protocol (IFMP), which handle call setup and flow redirection, respectively. Cisco even plans to submit Tag Switching to the Internet Engineering Task Force to spur industrywide adoption, just as Ipsilon did with GSMP and IFMP, sources said.

Ipsilon just completed an "IP Switch-a-thon" that tested interoperability between switches and servers from more than 20 vendors using GSMP and IFMP (*NW*, Aug. 26, page 1). Some of the vendors include IBM, 3Com Corp., Cabletron Systems, Inc., NEC and Hitachi.

"Obviously, Cisco is following the leader," said Larry Blair, vice president of marketing for Ipsilon.

Tag Switching is different from Cisco's first pass at high-performance IP networking, NetFlow Switching. NetFlow was simply a way to make packet processing more efficient within the router by caching more data; Tag Switching is a technique for cutting a hopless path through the network.

"Now we have a protocol that runs between [devices] and basically optimizes the IP forwarding path," said David Meyer, a senior network engineer at the University of Oregon in Eugene.

Cisco next week is also expected to enhance integration between its routers and StrataCom switches with a routing engine for the StrataCom boxes. The routing engine is designed to replace a stand-alone router as a termination point for IP data before it enters a switched WAN backbone.

"All they're saying here is, 'We'll give you some physical integration instead of buying yet another stand-alone box,'" said a source who requested anonymity.

The Tag Switching software and routing engine are expected to ship next year. ■

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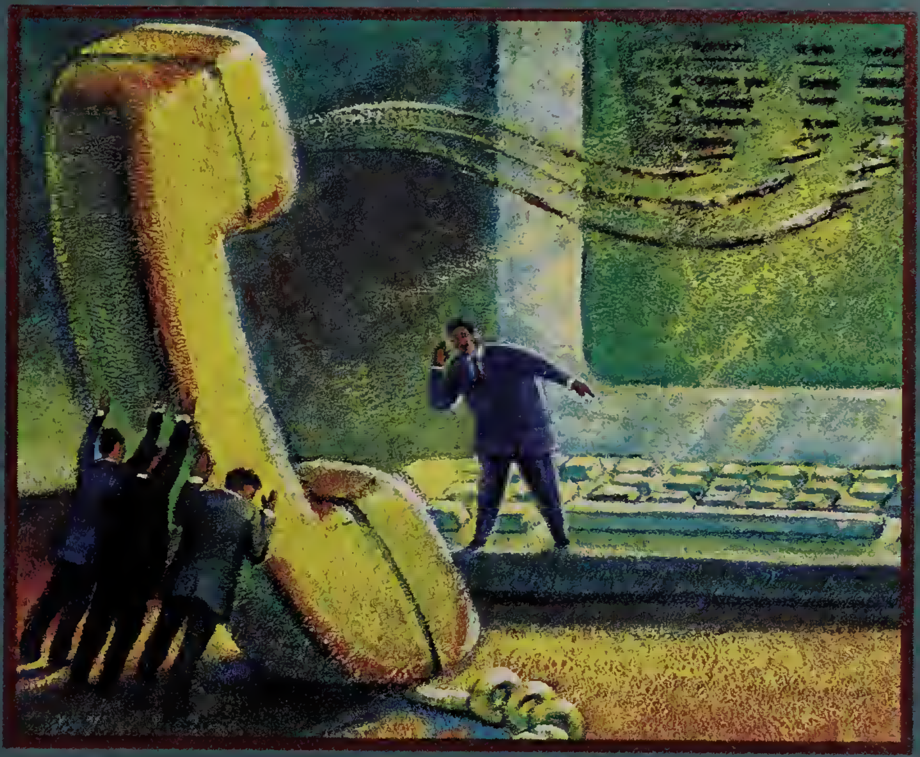

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Microsoft

Continued from page 1

tributed file systems to make this job easier.

I sneaked a peek at Microsoft's Distributed File Server (DFS), an NT 4.0 add-on that is available in beta today on the company's Web site. DFS allows an administrator to create a virtual file system that can be explored like any directory tree, but instead of exploring actual directories, users explore links.

Virtual folders in DFS point to actual directories in the network, so the physical location of the directories doesn't matter. DFS can even link to non-Microsoft servers as long as the client has the appropriate redirector. So in a team environment, a group could ask MIS to create a DFS with appropriately-named pointers to all the servers and file directories needed. If physical servers ever needed to be reorganized, all MIS would need to do is update DFS to point to the new locations.

I fired up DFS on Windows NT Advanced Server 4.0 connected to a NetWare 4.1 server and a Windows 95 workstation. I then invented a project proposal to build a refinery in Russia, with three members working on the proposal, and called it Project 32. I had no trouble using the DFS Administrator to create links for all of Project 32's required files. I created links to the NT and NetWare servers, as well as the Windows 95 machine (see screenshot). Unfortunately, this beta does not allow a Windows 95 client to access a non-Microsoft server through DFS, so I wasn't able to test that feature. However, all other links were navigated seamlessly from the Network Neighborhood in my Windows 95 client.

Presuming Microsoft will indeed create seamless links to non-Microsoft network servers, I found only a few trouble spots in this beta release. First, DFS uses the native security of the final operating system. This is a plus in that it doesn't require a new security system to be administered. But the drawback is that administering a project such as the one I created requires multiple tools. A large project with alot of links would be no easier to administer than it is currently, although it would also be no harder.

DFS is the beginning of a powerful tool that will make the finding of files in the enterprise easier.

Second, currently no tool exists to go through the links in a volume and determine if any have been broken. Given the ad hoc nature of Microsoft's peer-to-peer networks (Windows for Workgroups, Windows 95 or NT), people can move or delete directories without notifying MIS. When this happens, a link will yield an empty folder. A command to verify links would be a big plus to administrators.

Finally, the limitation of a single DFS host per server restricts the ability to create a powerful virtual environment. Imagine a Web server that could only have a single HTML file.

It could point to HTML files on other servers but only to non-HTML files on itself. You see what a limitation this would be. It would be nice to have a single server with a lot of DFS hosts that users could turn to, which would be similar to an intranet with one home page.

DFS is the beginning of a powerful tool that will make finding files in the enterprise easier. The ability to link disparate servers in one virtual directory structure is alone worth the effort of the upgrade (once the Windows 95 clients can use those links).

Its minor shortcomings should not be enough to keep you from implementing the final version of DFS in any enterprise, though the current beta is not stable enough for production. Microsoft has not yet determined when the final version of the product will ship.

Rinko-Gay is Director of the Network World/PC World Test Center.

Plaintree

Continued from page 1

viding this kind of capacity to support things like Gigabit Ethernet."

Higher port density is good news for customers, said Kevin Tolly, president and chief executive officer at The Tolly Group, a testing and research facility based in Manasquan, N.J.

"The need for higher port density at the 10M and 100M bit/sec levels is an important trend as more people embrace Ethernet switching and look to concentrate into a switch-of-switches," he said. "Most of the switches we've seen so far have fairly low limits on switched Fast Ethernet ports."

FITTING IN

Here's how Plaintree's WaveSwitch 9000 stacks up next to the company's other switches.

WaveSwitch 1018: 16-port Ethernet workgroup switch with two fixed 100Base-T ports.

WaveSwitch 1216: 16-port Ethernet department switch with two high-speed uplink slots.

WaveSwitch 4800: 8-slot data-center chassis that supports Ethernet, Fast Ethernet, FDDI and 100VG-AnyLAN. Provides an 800M bit/sec backplane.

WaveSwitch 9000: 15-slot chassis that supports Ethernet, Fast Ethernet, FDDI, 100VG-AnyLAN and Gigabit Ethernet. Provides a 16G bit/sec backplane.

The key to the WaveSwitch 9000's size and power is its switching fabric. Because the backplane has enough built-in overhead — providing 16G bit/sec of usable bandwidth — all ports are capable of running full-duplex at wire speed, according to Alan Greenfield, senior vice president of marketing and sales at Plaintree, which posted revenue of $23 million in fiscal 1996.

Initially, the WaveSwitch 9000 will act as a general-purpose 15-slot chassis that can be configured in many variations, from a desktop switch to a campus backbone switch (see graphic).

Later, Plaintree will roll out different models of the switch in smaller and larger form factors.

In addition to supporting Ethernet, Fast Ethernet and Gigabit Ethernet as interfaces, Plaintree will offer FDDI and 100VG-AnyLAN switching modules.

The company, however, has no plans to support ATM. "ATM is about to hit a brick wall, so we're betting the farm on Gigabit Ethernet," said Paul Weiss, vice president of marketing at Plaintree.

But the WaveSwitch 9000 is not just built for speed. The switch also supports Plaintree's SmartVIPS technology, which defines virtual LANs according to IP subnets, and automatically maps adds, moves and changes within the network.

In addition, the chassis supports Layer 3 switching capabilities — also known as virtual routing — that provide inter-VLAN connections.

As for net management, the WaveSwitch 9000 supports all nine groups of Remote Monitoring and can be controlled through Plaintree's WaveView Switch Manager or any other SNMP-based platform.

Pricing for the WaveSwitch 9000, which will be available in the first quarter of 1997, has not yet been set.

©Plaintree: (617) 290-5800.

Bay

Continued from page 6

LANcity cable modems integrated with the 5000MSX in about a year. This will function as a cable head-end aggregation point for cable service providers. For homes and offices, Bay will paste its name on LANcity's cable modems when the deal is final on Sept. 24, Sachs said.

Some analysts don't share Bay's enthusiasm for the cable modem market.

"I find it hard to believe the cable companies will be a major player" in data networking, said Larry Howard, senior analyst at Infonetics Research, Inc. in San Jose, Calif.

"They're really bad at providing cable service, so its hard to imagine people accepting them providing data service. I think the phone companies will be the long-term winners," he said.

New intranet harbor

Perhaps Bay will have better luck selling its switches into private intranets. For that, Bay unveiled several software enhancements to its Centillion 100 and added Centillion technology to its System 5000 to better handle the volume and cross-subnet nature of Web traffic (*NW*, Sept. 2, page 6).

To the Centillion 100, Bay is adding Layer 3 switching, IP multicast control, protocol-sensitive virtual LANs and Integrated Private Network-to-Network Interface support.

Bay also rolled out the 5000BH, a System 5000 chassis with a 6.4G bit/sec Centillion-based ATM backplane that has been in the works for well over a year (*NW*, April 10, 1995, page 1). The 5000BH will ship next year, marking a two-year delay in its release, acknowledged Rob Newman, vice president of switched internet products at Bay.

BAY SWITCHES GEARS

Enhancements to Centillion and System 5000 switches

- Layer 3 switching
- IP multicast control
- Protocol-sensitive VLANs
- Integrated PNNI
- Centillion ATM backplane (for System 5000)

The 5000BH will also prompt the phase-out of the 5000AH, a System 5000 chassis with an ATM backplane based on Bay's LattisCell technology, Newman said.

"They have assured me that, while they're not going to continue development [of the 5000AH], they're going to continue with compatibility" between it and the Centillion technology, said Bay user Evelyn Smithe, senior advisory systems engineer at AG Communication Systems in Phoenix.

All other products will also ship throughout 1997. Bay said it will dislose pricing closer to shipment.

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Security vendors batten down the Web

By Ellen Messmer

Atlanta

If it is true that great minds think alike, then the decision makers at AssureNet Pathways, Inc. and Security Dynamics Technologies, Inc. must be pretty sharp.

These two rivals in network authentication are extending their products to protect individual Web pages, too.

AssureNet (formerly called Digital Pathways, Inc.) and Security Dynamics will be at NetWorld+Interop 96 to demonstrate how their network access servers can be used to guard Web pages. The authentication process works by requiring users to input a onetime password generated by hardware or software tokens before they can read particular pages.

AssureNet's *Haynes says Web Defender will issue a challenge if you select a protected page.*

There is a risk in using the same password repeatedly on the Internet because it can easily be intercepted by hackers. Onetime passwords — sometimes called dynamic passwords — generated by card-shaped computer devices called tokens attack the problem of static IDs and passwords.

AssureNet and Security Dynamics each have their own line of authentication servers and tokens.

To extend its authentication server to protect Web pages with onetime passwords, AssureNet is developing Web Defender, which sits on the Web server and works in tandem with the core product, AssureNet's Defender security server, for 'Net access control.

With Web Defender, the page can be automatically wrapped in a single-function Common Gateway Interface script that can translate the browser's HTML into CGI.

"If you select a page protected with Web Defender, as the session manager, it issues your browser an eight-digit challenge," said Ted Haynes, product manager at AssureNet.

"Then your token is used to calculate an eight-digit response. The response is derived using the Digital Encryption Standard algorithm, so the response is unique to the token," he said.

The Web Defender session manager sends the token-generated response from the browser to AssureNet's Defender Security Server, which knows the user ID and what the correct answer should be. If the answer checks out, the user is allowed to view the Web page.

Security Dynamics will also unveil the way it has extended the use of its SecurID tokens to Web pages next week. Jim Geary, vice president of marketing, said Security Dynamics' software for Web page authentication will be ready to ship this month.

AssureNet does not expect to have its product ready until early next year.

Demand for Web page security is clear. One company, Oregon Blue Cross/Blue Shield, wants to be able to provide individuals, administrators and health providers with access to medical records via the Web.

"It would have to be authenticated, and token-based access on the Web would take pressure off our customer support group to retrieve records," said Jim Nicholas, director of information security at Oregon Blue Cross/Blue Shield. "Right now, we're accessing all the possibilities for doing this." ■

NETWORLD+INTEROP 96 10th ANNIVERSARY

COMMENTS?

See "How to reach us" on page 6.

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Learn computerspeak: Your key to success in the computer business

Here at the Gibbs Institute of Linguistic Anomalies and Obfuscation, we have been studying computerspeak, the new language evolving in the computer marketplace.

The most obvious indication a new tongue is emerging is the torrent of acronyms — specifically TLAs (three-letter acronyms such as RAM and ROM) and the gradual shift to ETLAs (extended three-letter acronyms including PCMICA and ISAPI). But acronyms are only a small part of computerspeak. Perhaps the most difficult elements to master are the phrases.

These phrases are now used by so many people that we feel a guide for nonspeakers would be useful, if not required self-defense. So, as part of our public service (that's another way of saying we do it for the PR value), we're offering a selection of nontechnical phrases to get you started:

Acronyms are one thing, but the phrases are even more essential.

Mark Gibbs

Beta release: This means, "We know this doesn't work properly, but we would like you to try it anyway."

Breakthrough product: This is a complex concept. The vendor got the alpha release to work, and now they are announcing the product and hoping to God that the beta flies and that they finally ship something to somebody who wants to pay.

Controlled deployment: Translated, "We're only trying this on secretaries' PCs because it will probably blow up, and we don't care what they think."

Customer-focused: Another way of saying, "We know we have customers, resellers and third-party developers, and we listen carefully to their needs and wants, and then we go and build the product we want to build."

Diagnostics: These are utilities that are promoted as sophisticated ways to help figure out why high availability (see below) has been lost. They usually don't help you fix the problem but will keep you busy until a new release arrives.

High availability: See "High level of service."

High level of service: This phrase means the product has been known to work. Usually. Well, mostly.

Leading-edge technologies: Usually describes unproven but neato ways to do things. Most often applied to products based on somebody's wild idea cooked up on the back of a napkin in a Chinese restaurant after one too many bottles of Wan Fu.

Mission-critical application: A key computerspeak phrase — this product will put your butt on the line and give you the worst migraines you've ever had.

New or latest release: Simply interpreted as, "We fixed the bugs in the previous release. Oh, and added a new set of bugs, as well."

Paradigm shift: Another key concept, in essence, "We have found an even more bizarre way to do things, and we want you to spend lots of money on it."

Reseller network: A barely controlled set of distribution channels that has all the stability of a plate juggler standing up in a hammock wearing roller skates.

Strategic deployment: Very different from controlled deployment. This one means, "This app is so darn good, I'm going to put it on the CEO's, CFO's and CIO's PCs and hope some glory sticks to me."

Technology enhancement: Simple — "We added the stuff we forgot or couldn't make work in the last release. Oh, and a new set of bugs."

Here at the Gibbs Institute, we believe that in another generation or two, large numbers of people in the computer business will forego their mother tongues and convert completely to computerspeak.

As these people will be some of the richest in our society, you owe it to yourself and your children to be able to converse in the language of the future.

Don't delay. Send your examples of computerspeak to Gibbs at mgibbs@gibbs.com or call him at (800) 622-1108, Ext. 504. T-shirt for the best submissions.

The Bells as underdogs? They are barking up the wrong tree

Americans like to root for the underdog, but what do you do when the casualty is,well, a smelly old pooch who needs a bath?

In this case, the underdog is the beloved batch of bowsers known as Baby Bells. And, boy, are they howlin'. Every dog's bark sounds like "Wolf!" so it's a good idea to determine how we should heed these yelps.

Dave Buerger

Last week I described competitive pressures that threaten Baby Bell cash flow and profits. This week we'll examine a technical ploy the Bells are using to make the Federal Communications Commission and state public utility commissions feel sorry for them.

Baby Bells are setting up Internet service providers as bogeymen. The Bells are mad about a profit hit caused, they say, by flat-fee access to the Internet and online services. You should pay attention because the Bells' success with this contrived tactic could cost you big money.

Last month, bean counters at Bell Atlantic Corp., NYNEX Corp., Pacific Telesis Group and US WEST, Inc. filed studies with the FCC proving that Internet afficionados are "inefficiently" using the public switched telephone network. Carriers said they must counter users' wanton behavior by installing extra, expensive central office (CO) equipment. They insist these improvements be paid for with usage-based pricing.

The Bells say ignoring their plea risks overwhelming the local telephone network with service interruptions. The result could lead to "unthinkable consequences," including disrupting public safety services such as 911. Surely, we can't let that happen, right?

One study from Bell Atlantic (http://ba.com/ea/fcc) tracked usage at nine randomly selected COs for a period of one month this year. The study claimed the average length of all calls to ISPs was 17.7 minutes vs. an average of 4 to 5 minutes for all other calls. It said the longer ISP call duration blocked circuit availability, forcing the addition of CO line units, switch modules and interoffice trunking gear.

The Bells' true agenda is to make ISP rates higher than their own new Internet access services.

Bell Atlantic estimates that in 1996 it will run about 40,000 circuits from COs to ISPs, half on primary rate ISDN and half on analog lines. It claims a monthly cost of $75 per analog line and $50 per ISDN circuit, or $30 million a year. It says revenue from these circuits is $8 million and wants authorization to cover these costs.

Based on current tariffs, ISPs pay .09 cents per minute of use, which is 1/22 of the 2 cents per minute rate paid by interexchange carriers "for arguably the same service."

In monopoly lingo, Bell Atlantic wants to send the "right signal" to "encourage efficiency and stop cross-subsidies." It wants to charge ISPs access fees of 2 cents per minute.

Sounds to me like a new version of the modem tax. In the '70s and '80s, carriers wanted to charge bulletin board operators extra fees, fearing the traffic would swamp switches and block 911 calls (gosh, there it is again).

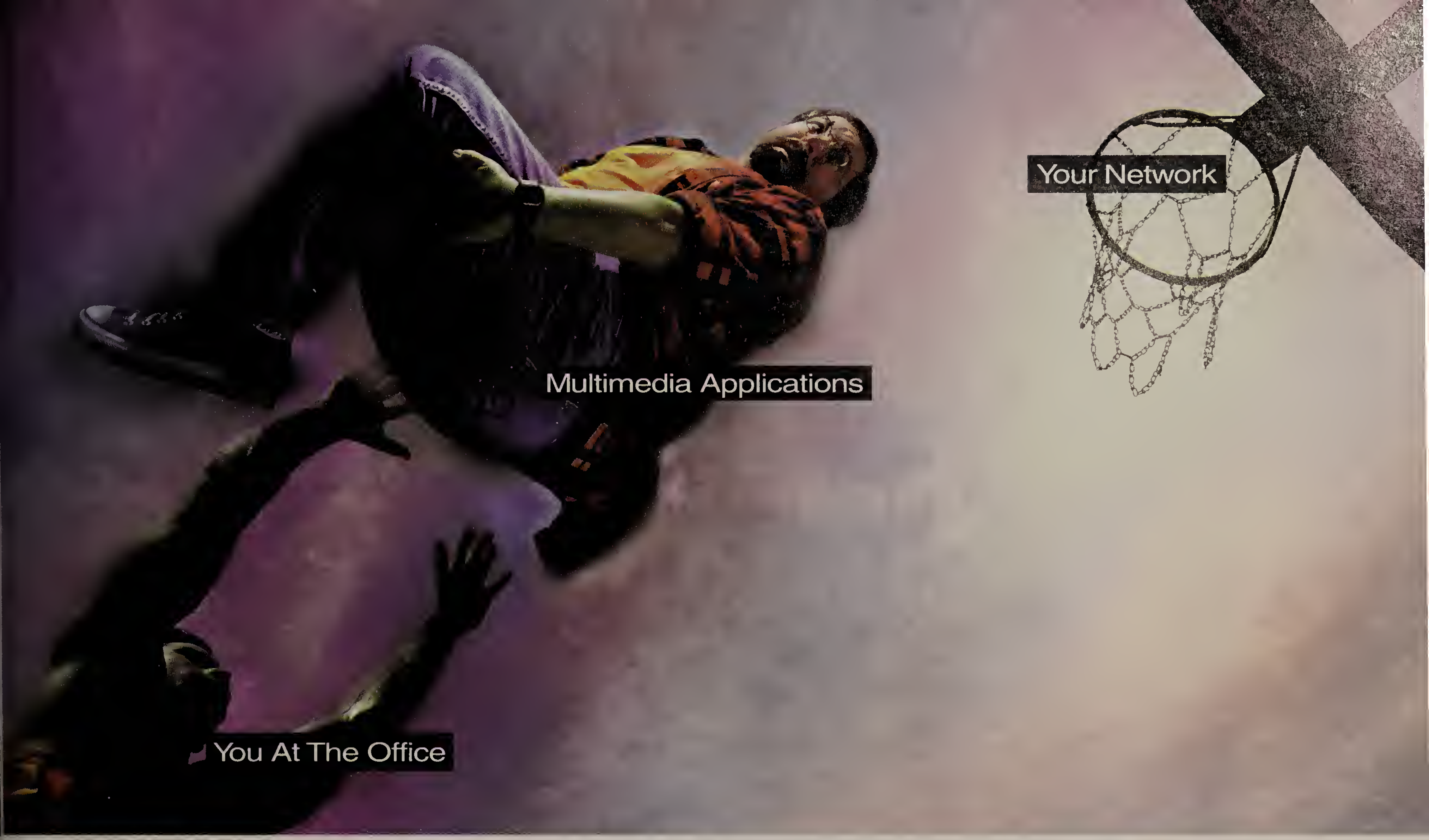
If the Bells are so worried about excess traffic, why do they encourage us to add extra phone lines? Of course, everyone's calls average 4 or 5 minutes. Oops, forgot about teenage callers. Better add a teen surcharge to keep the 911 system safe. While they're at it, sock it to the telecommuters and anyone else who exceeds the correct call duration. Darn users had better fit the program or else!

The Bells' true agenda is to make ISP rates higher than their own new Internet access services. Bell Atlantic says so in its own report, calling its Switched Multimegabit Data Service-based offering a "more appropriate technology." Surcharges will help ISPs "voluntarily" switch to the new service.

Surcharging ISPs won't reduce loads on the public network except through the attrition of angry users. Surcharges will make Internet access services from competitive access providers and cable companies look mighty attractive.

Trust the Bells to chase away their own customers. This is one case where the underdog is barking up the wrong tree.

Buerger is a networking industry consultant and writer in Atlanta. He can be reached at dave@buerger.com.



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A Supplement to

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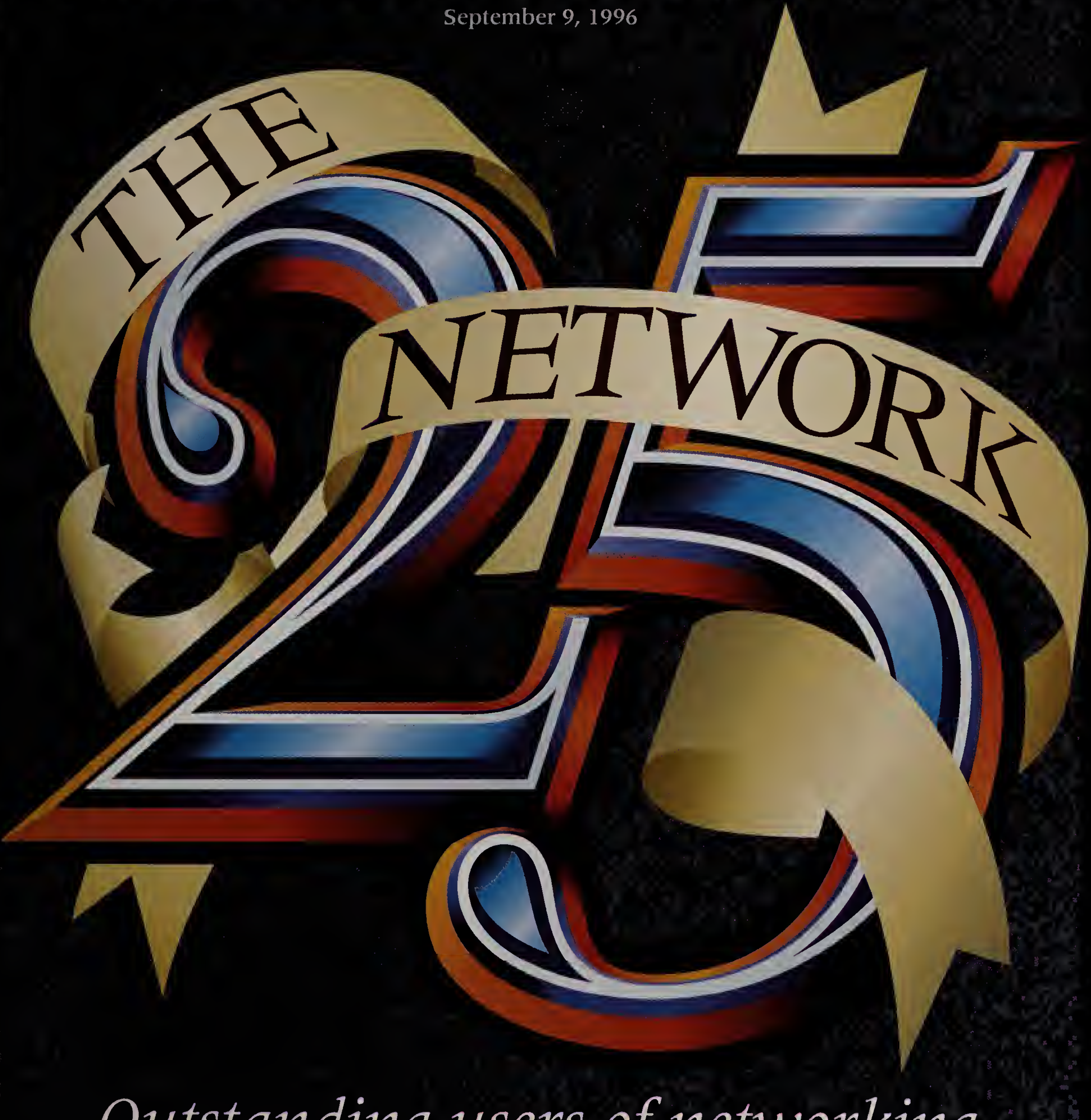

Outstanding users of networking technology from around the world

Produced in cooperation with *Computerworld*

Eric Benhamou
President & CEO, 3Com Corporation

3Com salutes the "Network 25."

When Marshall McCluhan first wrote about the "global village" in the 1960s, he foresaw a world brought closer together by strong communications providing access to information regardless of location. In this new world, traditional barriers of time and space would vanish–displaced by the power of access to computing, telecommunications and networking resources. This "Network 25" special supplement–a joint venture of *Computerworld* and *Network World*–profiles organizations around the globe which have dynamically employed network computing to turn this vision to their real world competitive advantage.

As information technology moves into the 21st century, network access to information will be much simpler and more affordable. Users will access data via dramatically faster networks, and information will combine text, graphics, audio and video. A fully open and deregulated environment will encourage connectivity that spans the globe, touching us all at work, home and play.

The organizations featured in this supplement are at the forefront in applying network computing to advance communications. 3Com proudly recognizes their vision, and their understanding of the value inherent in access to information technology.

Sincerely,

Eric Benhamou

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THE NETWORK 25

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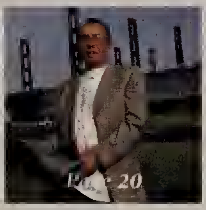
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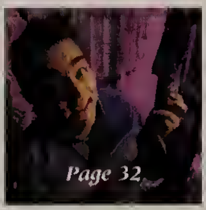
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Cover Typography: Dennis Ortiz-Lopez

Eric Pearl

EDITOR'S note

Net Work

WELCOME TO THE NETWORK 25, a joint production of *Computerworld* and *Network World*. Nominated by editors in 18 countries and written by reporters from all four corners, our issue includes some outstanding and imaginative networking users.

Whether in Chicago, Sao Paulo or Johannesburg, these 25 companies face similar issues: How do we connect far-flung operations to create a true global organization? What does global telecommunications reform mean for our ability

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to communicate across international borders? What will the impact of the Internet and intranets be on the company's business?

No doubt, those are the same questions that keep you up at night too.

In some parts of the world, the issues are even more complex. In China, for instance, a central government sets policy. In Japan, culture and tradition have slowed the transition to a network-centric business model. South America and Africa share "emerging economy" issues. And Europe has a unique set of multicultural obstacles to overcome as it stumbles toward something resembling economic unification.

All the stories behind these 25 companies are relevant to your company, especially if you have or plan to have an international presence. Use them to benchmark your own networking capabilities.

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THE NETWORK 25

Outstanding users of networking technology from around the world

ABB, Switzerland

Amoco, USA

Banco Bradesco, Brazil

Barclays, U.K.

Benetton, Italy

Black & Veatch, USA

Cemex, Mexico

Cervecerias Quilmes, Argentina

Charles Schwab, USA

CSX Transportation, USA

Federal Express, USA

First National Bank, South Africa

Fisher & Paykel, New Zealand

Geffen Records, USA

Maruti Udyog, India

Merita Bank, Finland

National Computer Board, Singapore

Petrobras, Brazil

Peugeot, France

Schindler Informatik, Switzerland

SmithKline Beecham, USA

START Informatik, Germany

Swissair, Switzerland

Tempus, Bulgaria

The Times of India

Executive **SUMMARY**

World-wise

Effective networking distinguishes these 25 global companies.

THE 25 COMPANIES LISTED on the facing page share one common characteristic: Every one is an innovator. Whether it's *The Times of India*'s commitment to creating the country's first major intranet application or Brazil's Banco Bradesco's eagerness to tap new technologies to expand its international business, these 25 firms are all pushing the networking limits.

Of course, business challenges differ. First National Bank in South Africa is adapting to a post-apartheid regime by expanding its banking network into new areas. Amoco Corp. is working to improve connections between oil exploration vessels and platforms in remote locations. And ABB Asea Brown Bovari Ltd., the $30 billion Swiss engineering company, must decide how to standardize communication among its roughly 1,000 companies in 140 countries without compromising their autonomy.

Still, some themes run through all 25 companies. Indeed, they resonate with all companies exposed to global competition:

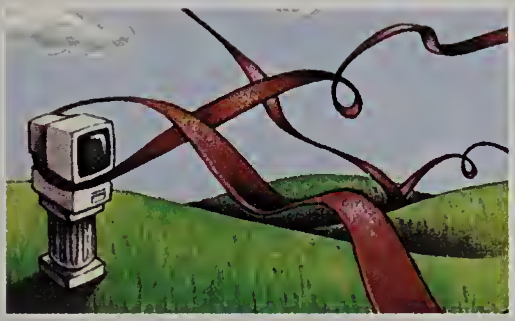
- **Global Reach** *(page 20)*. Multinational firms are struggling with how to transform themselves into global companies. Global companies have well-integrated operations, whereas multinationals have stand-alone regional operations. Global networking buys companies higher productivity and close connections with their customers and suppliers.

Take Benetton Group SPA. The $1.9 billion Italian clothier is a virtual corporation that draws on the capabilities of 120 participating companies in 30 countries. The results speak for themselves: Both revenue and net profits were up last year.

At Black & Veatch Corp., the $1.1 billion engineering company with 80 offices worldwide, the challenge is to get information to engineers in remote locations to construct public utilities. The cost savings of effective networking can be counted in the millions of dollars, the company claims.

One of SmithKline Beecham PLC's networking initiatives is to improve supply chain management by the way its employees communicate with customers and suppliers. As one executive at the U.K.-based international pharmaceuticals firm puts it, "Any im-

Continued on page **8**



BETSY LYON

TECHNOLOGY
PROFILES

To be nominated for the Network 25, companies had to excel in at least one of these technology areas. For the complete methodology, see page 49.

SWITCHED NETWORKS. Where traditional LANs require users to share capacity on network links, switched network technologies provide instantaneous connections between two networks' devices. That allows them to share information at much higher speeds. The link is maintained for only as long as the devices communicate, in much the same way that a telephone network supports a link between two phones during the duration of a call.

The way such connections are made depends on the network's architecture; most corporate networks today have so-called shared-LAN architectures, such as Ethernet or Token Ring. These technologies are running into capacity problems where bandwidth-heavy multimedia and collaborative computing applications are in use. Global networking leaders are deploying new technologies such as Asynchronous Transfer Mode (ATM) and switched Ethernet to support such new uses.

MOBILE/REMOTE COMPUTING. Using a computer off-site and connecting to the company network via modem, wireless technology or other means. One of its dirty little secrets: the inferior service access to applications and information its users get. Leaders here are using innovative techniques to put all corporate network users on equal footing and bring the power of networking to every aspect of the company.

Continued on page **8**

Betsy Lyon

TECHNOLOGY **PROFILES**

Continued from page **7**

Internet/intranets. The Internet, and its graphical component, the World Wide Web, is the interconnected tangle of global networks. Intranets are in-house networks that use Internet technologies but are protected from outsiders by firewalls. Both are having a profound impact on how companies provide service to their business partners, customers and internal users. Leaders are extending their businesses electronically to market, sell and support products; internally, they are simplifying operations through intranets. Such organizations are seeking easier access to information, applications and useful services.

Internetworking. Corporate networks today are really internetworks, a quilt of interconnected LANs and WANs that support a variety of applications and departments. Leaders in this area are deploying technologies such as routers, intelligent hubs and virtual LANs in innovative ways to make it easier for workers to collaborate on projects and allow leaner, flatter organizations to respond more quickly to changing market conditions. The internetworking arena itself is undergoing dramatic changes, as new high-speed technologies offer more options and as mergers and acquisitions change the competitive landscape. The top internetworking users are staying ahead of the curve, enabling their networks to support more users and network-intensive applications.

Network management. The area devoted to managing and controlling all the components on a network. Demands on the network grow exponentially, but the resources and skills to manage networks grow much more slowly. Technology, ironically, offers only a limited set of answers for network management problems. Leaders in this area have adopted new, intriguing approaches to managing their networks and the applications that reside atop them.

Groupware/collaborative computing. Software that automates a task among multiple workers or that helps workers anywhere in a company share information, work on projects and tap into the greater corporate knowledge base. Companies that build and deploy such applications outpace peers that may have spent billions building global information networks but use largely un-networked applications.

Global networking. Building a network that supports sites around the world. Leaders here know what it means to deal with differing regulatory requirements, wide-area network services, equipment suppliers, support offerings and labor markets. ●

Continued from page **7**

provement in communications [translates into] savings and competitive advantage."

- **Use of the Internet** *(page 31)*. The Internet has the potential to change the economics of competition. The 'net allows small firms to meet millions of potential customers in a way that wasn't possible just a few years ago. And it breaks down international barriers: Companies worldwide can now compete with U.S. firms in their own backyards.

While the Internet helps them compete globally, intranets enable them to improve productivity. *The Times of India,* for example, is setting up the country's first major intranet in an attempt to streamline many business functions, further enhancing its ability to compete.

Another issue many companies face: how to save huge investments in software such as Lotus Notes in an increasingly Internet-centric world. ABB, with 50,000 Notes users, is figuring this out.

- **Telecom Reform** *(page 14)*. One of the biggest question marks in any company's long-term networking strategy is the implications of global telecommunications reform. A truly international phenomenon, reform is at different stages in virtually every country in the world. Experts present any number of scenarios for how reform will unfold between now and 2000, the deadline for an international agreement set by the World Trade Organization.What to do in the interim? Don't sign too many long-term contracts.

- **Asia's Ascendance***(pages 9, 26)*. The Pacific Rim is a hotbed of networking activity. But all nations are moving at their own speed. Japanese companies, once considered invincible by their Western counterparts, are viewed as far behind when it comes to networking. But as the country emerges from recession, some progressive companies, such as Matsushita Electric Industrial Co. and Kao Corp., are proving the value of networking to their peers.

China is coming on strong with billion-dollar infrastructure investments planned for the next five years. Current investments are spotty at best, but cities such as Shanghai are making great strides in improving their networking capabilities. ●

Down but not out

Sustained by *manufacturing success, Japan almost forgot to come to the networking revolution. Now it's catch-up time.* → **By Rob Guth**

UNTIL RECENTLY, the term "networking" in Japan was used solely to describe the expansive web of contacts necessary for success in a country built on personal relationships. Measured in stacks of business cards and empty bottles of hangover elixirs, your average Japanese office worker's network had little to do with PCs, Ethernet or domain names.

Still riding high from their success in the booming 1980s, Japanese companies in the early part of this decade were convinced their manufacturing prowess could sustain them forever. They did little to streamline their operations through PCs and networks.

"Until 1992 most Japanese businesses were quite complacent," says Shumpei Kumon, a member of several government information technology advisory groups and executive director of the Center for Global Communications (Glocom), a think tank in Tokyo. "They felt Japan and Germany had won and the U.S., like the Soviet Union in the Cold War, was the loser."

It was not to be. Japan sank into a recession and the yen hit record-breaking levels, squeezing profitability out of Japan's exports. Moreover, companies realized that Japan's vaunted lifetime employment system had actually created a herd of bloated, inefficient behemoths.

Meanwhile, the U.S. — where Vice President Al Gore had just proposed his National Infrastructure Initiative (NII) — appeared to be moving quickly ahead in the eyes of Japan's business and government leaders. Japan's former sense of invulnerability that prevailed at the height of its economic bubble now turned into a realization that the island nation might lose the race into the Information Age.

"Japanese businesses' confidence was replaced by a sense of incapability," Kumon says. The companies saw the U.S. shift from "bashing Japan to surpassing Japan."

A February 1995 cover story in the international version of *Time* magazine summed it up: "Missed Connection: Japan plays catch-up on the information highway."

And what a frenetic catch-up it is.

In the roughly five years since news of Gore's proposal first hit the upper reaches of Japan's government, the country, in fits and starts, has embarked on a frantic bout of network building.

TOM WAGNER/SABA

→ **Naotake Furukawa** *says Matsushita's network expansion into China will save money and test new technologies*

Down but not out

On the office level, that means LANs. Though Japan still lags far behind the U.S. in PC and LAN penetration, the PC market exploded last year, growing nearly 70% over 1994. Next year, nearly 50% of all companies will have LANs, nearly twice the number in 1994, according to market researcher IDC Japan Ltd.

On the global front, many of Japan's multinationals have quietly begun building and expanding high-speed networks that link their global diaspora of subsidiaries, affiliates and partners.

To be sure, the road hasn't been easy, nor are Japan's businesses in general particularly wired. Strict regulations initially hindered the growth of the Internet, and persistently high leased-line tariffs controlled by a recalcitrant Nippon Telegraph and Telephone Corp. (NTT) continue to hamper network growth.

Perhaps the biggest example of the government's groping is an ambitious NII plan of its own, announced in May 1994 by the Ministry of Post and Telecommunications (MPT). It calls for a nationwide fiber-optic backbone to be built by 2010 at a cost of up to a whopping 55 trillion yen, or about $55 billion. The network, which is to be jump-started by low-interest government loans, would create a market worth 123 trillion yen ($1.23 trillion) by 2010. That far surpasses the size that Japan's automobile and electronics industries are each expected to reach in the same period.

Hiroshi Nishiyama

"1996 is the year of the Internet in Japan," *says Shumpei Kumon, executive director of the Center for Global Communications in Tokyo.*

In short, the grand plan has largely been dismissed as a pipe dream, and most business leaders have stopped waiting for their government to lead by example.

"We are a global company — 75% of our business is outside Japan — so we essentially don't care about the [national] information superhighway," Nobuyuki Idei said soon after the MPT plan was announced and before he became president of Sony Corp. in April 1995.

Idei's sentiments are echoed by droves of top executives. Pressed by the need to improve their white collar efficiency at home and in many cases link together their extensive operations around the globe, businesses have found a new lease on life through networking in the IT sense of the word.

Consumer electronics giant Matsushita Electric Industrial Co., the company behind the Panasonic, National, Quasar and Technics brand names, links — in addition to 500 Japanese business units — about 100 of its 183 overseas operations with a network it calls PanaVan.

Running at speeds between 128K bit/sec. and T1 (1.5M bit/sec.), the network carries internal voice, fax and data traffic. It has also streamlined the exchange of purchase-sales-inventory, shipping and general business planning information, according to Naotake Furukawa, leader in the planning department at the company's Osaka network center.

Having established hubs in Malaysia, Hong Kong, Taiwan and the Philippines, Matsushita is now expanding PanaVan into China. It expects by year's end to link 34 operations across the world's most populous nation.

In part, expansion of the network in Asia has been indirectly driven by the high yen. As exchange rate pressure has forced Matsushita to shift manufacturing to lower-cost sites outside of Japan, the network has followed as a means to manage the growing number of offshore sites.

The biggest benefit to date has been a cut in communications costs — the China expansion will reduce Matsushita's China communications costs by a reported 20%. The network is also a test bed for new technologies and services that Matsushita may one day make money on, according to Furukawa.

As for the Internet, most of the activity has been focused on building World Wide Web sites, but more advanced use of the Internet is beginning to take hold, observers say.

"1996 is the year of the Internet in Japan," Glocom's Kumon says confidently.

Osaka-based Kansai Electric Power Co. is constructing a TCP/IP-based intranet that by 1998 will link roughly 10,000 employees using Lotus Development Corp.'s Notes at the company's 111 offices in Japan's Kansai region, an official says. Reportedly costing roughly 5 billion yen ($46.7 million), the network will be one of the first large-scale intranets to hit Japan.

TO BE SURE, advanced internetworking is still the exception in Japan. In part, high access charges — Internet access fees in Tokyo are roughly 10 times what they are in Silicon Valley — have constricted growth. But those charges might soon be history if NTT becomes an Internet provider and, using a fiber-optic backbone, lowers access fees to roughly equal what they are in the U.S.

But though prices will fall, a more entrenched obstacle remains: managers' resistance to change.

Complains Mikio Arai, webmaster at Fujitsu Ltd., "Over 50% of my time is sacrificed battling managers who don't understand the importance of the network or the future role the network will play in their lives." ●

GUTH *is Tokyo correspondent for the IDG News Service.*

Commentary

BY Shuji Honjo

Catching on?

TO GET A SENSE of just where Japan stands when it comes to networking, consider these statistics:

- Last year only 14% of Japanese workers had PCs. In the U.S., 47% of workers did.
- Only 35% of Japan's PCs are networked, compared with 82% in the U.S.
- Japan has 160,000 host computers for the Internet. The U.S.? Four million.

There are many reasons for the lag, involving economic, cultural and technological factors.

From an economic standpoint, Japanese users often argue that high telecommunications costs limit networking activities. Nippon Telegraph and Telephone Corp., the country's dominant telecom provider, is a monopoly and keeps prices high.

Culturally, long-standing practices of keeping tight reins on the flow of information within companies has discouraged network proliferation. Capable people often try to keep important information to themselves. In a country with a penchant for hierarchy and consensus management, internal networks are often viewed as a threat.

And between companies, networking is hampered by the love affair with custom software. The result is that simple data exchange from one business to another is often quite difficult. The bottom line: Industry standards for data communications have been slow to evolve.

Technical problems inhibit networking, too. Typically, Japanese companies are committed to proprietary platforms from the likes of IBM, Fujitsu, Hitachi, NEC and others. Few have a consistent strategy to deploy open systems. It's not uncommon for several incompatible platforms to be deployed, making the situation worse.

But there are exceptions. A few innovative companies are embracing network-centric IT strategies and succeeding. Take Kao Corp., a supplier of cosmetics, soap, disposable diapers and other consumer products. It has shifted from multiple platforms and data formats to a compatible platform and integrated data formats, and from central computing to distributed computing with shared databases. It is experimenting with a "virtual factory," whereby two factories are controlled as one through a high-speed digital network.

It's not too bold to say that networking will drive Japanese corporate renewal in the 21st century. Early innovators are the bellwethers. ●

➾ **HONJO** *is manager of business planning at CSK Corp., a professional services firm in Tokyo. He has extensive experience in business consulting and venture investment around the Pacific Rim.*

Photo: Tom Wagner/SARA/Photoillustration: Eric Pearl

FDDI SOLUTIONS FAST ETHERNET SOLUTIONS BUILDING/CAMPUS SOLUTIONS HOME OFFICE SO

SWITCHING SOLUTIONS REMOTE ACCESS SOLUTIONS STACKABLE SOLUTIONS S

Cómo administr
redes ATM

¿Puede implantarse la estrella más reciente de

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Otra diferencia
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Es verdad que
modificarán. Scott

Will ATM live u
to its promise

Analysts argue about the much talked-about ATM technol
UPI

As of today, Asynchronous Transfer Mode (ATM) proc
been little used. The hope among vendors was that compl
architectures would provide users with everything they

he vendors still coming

ATM
An der S
Die techn

Qui a peur de l'ATM ?

La migration des réseaux locaux
commutés vers l'ATM.

Les responsables des services informatiques peuvent
appliquer les connaissances qu'ils ont acquises pour les
réseaux commutés à l'ATM.

Les analystes recommandent à leurs clients d'étudier le
cas de certaines sociétés, par ex
lorsqu'ils envisagent d'adopter
cette migration exigera sou
matérielle assez coûteuse.

Les clients de Domeplex
commutation de circuits, les r
binaison des deux méthodes

En règle géné
guère l'évolution technologi
de Domeplex coïncide avec le
éventuelle migration. Pour rep

The ATM Debat

As Ethernet networks fill up, the network's next salvation – ATM – is still being developed.

Enough talk.

user desktops at her glue distillery.

Now, just a few years later, Karen is once again faced
the threat of a saturated network. So just this past sprin
began looking at the networking's latest answer to band
Asynchchronous Transfer Mode (ATM).

But instead of answers, all Karen found was rheto
was surprised to find very few vendors offering the techn
And I was even harder pressed to find anybody using it."

The talk and debate surrounding ATM has grown
nentially over the past few years. ATM's flexibility, high
mission speeds and support for many media types have
LAN managers and top executive chomping at the bit
excitement.

Bandwidth-hungry applications ranging from
neering designs to videoconferencing are just a few ap
tions that are ready-made for the new technology. But it

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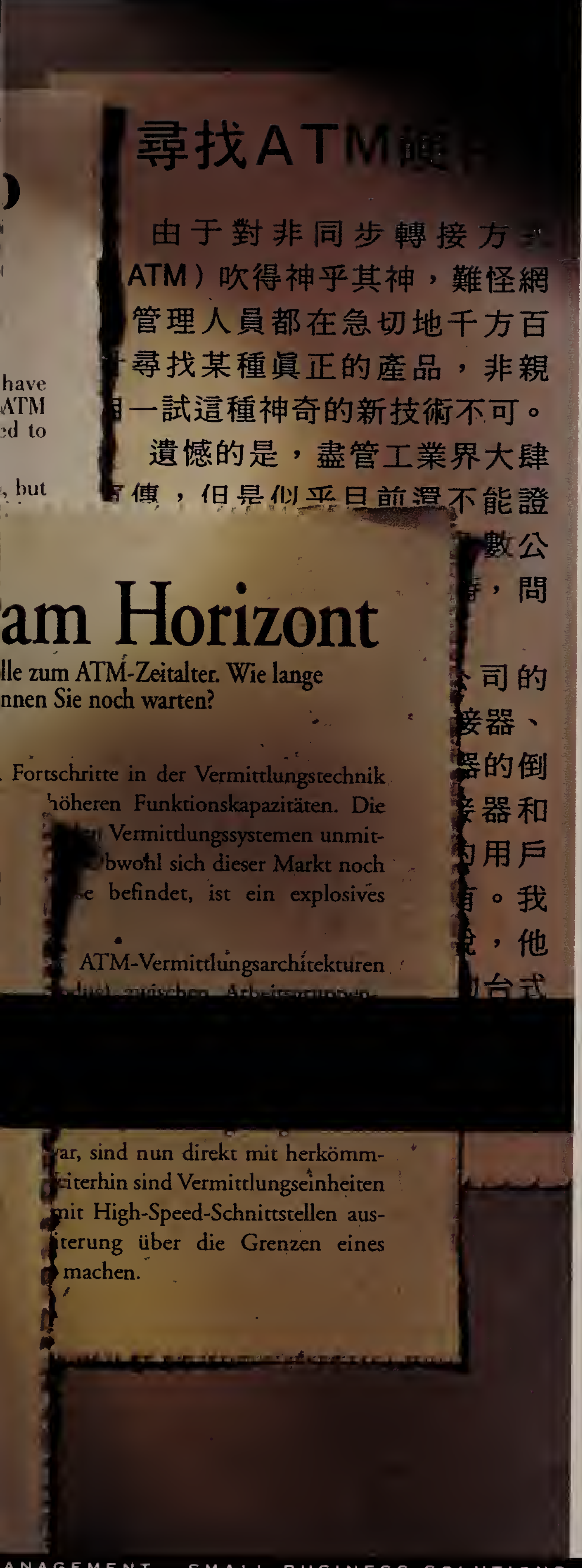
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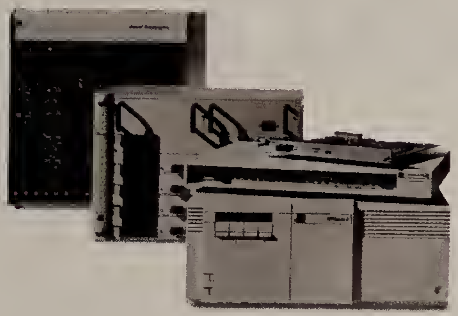

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SUSAN LEVAN

a better connection?

Telecom reform around the world promises better, cheaper, faster service for corporate customers. But when will the payoffs materialize? → **BY Paul Korzeniowski**

LAST YEAR, Zurich-based ABB Asea Brown Boveri Ltd. wanted to install a global frame-relay network to support its operations in Asia, Europe and the U.S. that used Lotus Development Corp.'s Notes groupware.

Carriers were willing to give the company a networking deal for five, seven or even 10 years, but ABB demanded a two-year contract. "We do not want to get locked in to a long-term deal which would seem overpriced and obsolete in a few years," says Lars Sandel, a telecommunications manager for the corporate information systems staff in Zurich. ABB got what it wanted.

Telecom analysts agree that Sandel was wise to hold out. The rapid pace of telecom reform around the world will wreak havoc with service and pricing schemes during the next few years, they say. After years of posturing and often fruitless negotiations, many countries have begun moving earnestly toward telecom deregulation.

Significant work still lies ahead, but the pace is quickening and will alter the way that large international corporations build their networks.

The most obvious change: a smorgasbord of choices. In many countries, the national telephone monopoly is the only game in town; it carries every network connection. With deregulation, those nations will have at least two, and perhaps as many as a dozen, alternate suppliers.

Increased competition will bring lower rates, especially for businesses. New carriers, which don't have the infrastructure to reach all residents, typically target commercial customers. For example, London-based Mercury Communications Ltd. went after the business customer when the U.K. deregulated its services in 1984. To fend off the attack, giant British Telecommunications PLC (BT) cut its business rates while maintaining prices for residential service, says Eric Owen, an industry analyst at the London office of International Data Corp. (IDC), a market research firm.

Today, Great Britain is one of only a handful of regions with a competitive telecom market; Finland, Sweden and the U.S. are others. During the next three to five years, however, the number of deregulated markets could increase to more than 50, changing the global landscape.

SINGLE SOURCE

Besides offering lower rates, carriers are building end-to-end global services geared to large corporations such as ABB. Currently, firms have to station network managers around the world to deal with local carriers and monitor network performance. Many would prefer to hand that task over to telephone companies.

Carriers have begun teaming up and building single-source international services. One of those services is WorldPartners, which includes AT&T Corp., Kokusai Denshin Denwa Co. in Japan and Singapore Telecom. Another is Phoenix, a joint venture among Deutsche Telekom, France Telecom and Sprint Corp. Still another is Concert, a collaboration between BT and MCI Communications Corp. to sell global services. In June, Concert unveiled an international Internet access service. "Every large company is struggling with ways to get its users on the Internet, so this service is well-timed," IDC's Owen says.

Continued on page **16**

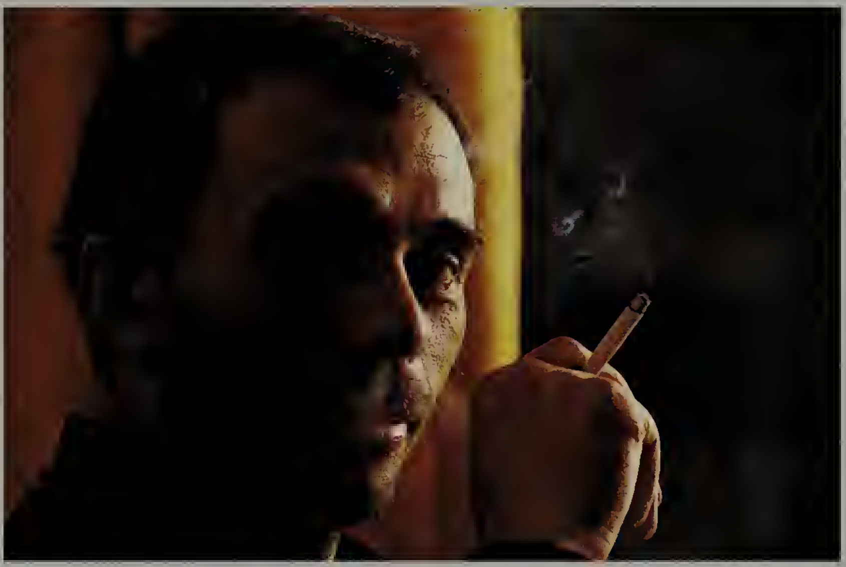
free enterprise

BY Jeanette Borzo

FOR GREGORY DMITRIEV, telecommunications deregulation has meant more than just the right to provide services previously monopolized by the state government. It's meant the right to self-determination.

"Deregulation — I don't think it's the right word," says Dmitriev, president and CEO of IncomA in Moscow. "Privatization" is a better term, he says. It is privatization that enabled Dmitriev to set up his company and create FastNet, the first frame-relay network in Russia, in 1993.

"In the States, deregulation means that the local exchange provider can provide long-distance services. What happened in Russia is more like [private companies getting] the right to install private telecommunications services," Dmitriev explains.


Peter Blakely/SABA

IncomA's Gregory Dmitriev *set up Russia's first frame-relay network in 1993. 'There was no way to do something like this before [privatization],' he says.*

Dmitriev started his business in 1990 — just two years after perestroika and the push to privatization began — by setting up electronic-mail services for the Central Bank of Russia. "After a year of operations, we got a problem with connectivity, and we needed a network to provide good service," Dmitriev says. "We put in a couple of nodes, got several customers and realized we must extend the network. Now we have seven nodes."

IncomA expects to add another two or three nodes in Moscow soon and 10 around the country later. IncomA, which currently has some 300 clients, is adding about five customers per month.

Rather than working with the Moscow city telephone network — the formerly state-owned agency that is now partially privatized — Dmitriev has found it less risky and more cost-efficient to use a variety of private providers, including the Moscow subway and the Ministry of Railways, for network cable and nodes. ●

BORZO *is an IDG News Service correspondent in Paris.*

Continued from page **15**

Because the partnerships are so new — formed only during the past two years — they are experiencing start-up pains. "The teams need to connect their networks, train their staffs and package their service offerings," notes Joanne Downey, director of European telecommunications research at Giga Information Group in London.

"Because these carriers are so large and the task is so complex, their progress has been slower than customers desire," Downey says.

Industry analysts agree the partnerships have potential. The teams should relieve network managers of the headaches of troubleshooting international lines. They have significant clout, too, which will help them negotiate with national carriers and offer lower rates.

But the joint ventures are no panacea: They are strong in a handful of countries but leave much of the globe uncovered. To address this problem, the teams are expected to add members during the next few years. Eventually, every major carrier may team up with one of those groups.

QUALITY IN QUESTION Of course, there is a cost to reform. As competition intensifies, carriers will have to become more cost competitive, and that usually leads to downsizing.

Since deregulation occurred, BT has cut its staff in half, from 200,000 to 100,000. And in a dozen years, AT&T and its seven subsidiaries have cut 120,000 employees from the payroll; the company plans to sever 40,000 more workers during the next few years as part of its recent breakup.

Such constant cutting affects corporate network performance.

Susan LeVan

✷ **Decreasing quality of service could prompt a firm to switch carriers**

Just ask Harry Tompkins, manager of Internet services at Ciba-Geigy Corp., located in Tarrytown, N.Y.

"Carriers have eliminated many experienced middle-level managers," Tompkins says. "Consequently, network quality of service has been slipping. Problems are more frequent, and fixing them takes more time."

To date, the issue has been annoying rather than catastrophic. But decreasing quality of service could prompt a firm to switch carriers. Global companies such as ABB, with short contracts, will be in the best position to adapt. ●

→ **KORZENIOWSKI** *is a freelance writer in Malden, Mass. He can be reached at paulkorzen@aol.com.*

Commentary

BY Daniel D. Briere

Don't hold

CONVENTIONAL WISDOM has it that by late 1997 or early 1998, the launch of international communications competition will usher in a new age of global telecommunications. This belief has been fueled by telecom reform in the U.S. and across Europe and, on the international stage, through the World Trade Organization's (WTO) telecom talks.

The reality, however, is that the race among communications carriers has already begun. Most carriers vying for foreign business, such as AT&T with its WorldPartners, MCI with its Concert effort and Sprint's GlobalOne venture, are beginning to look like marathoners at the 20-mile mark — still running but getting awfully tired. Users, too, are reaching exhaustion. They are tired of unfulfilled promises of one-stop shopping, integrated billing and single customer support numbers.

Improvements are in the offing, but don't hold your breath. Until the myriad national and international rules are firmed up, there will be a lot of talk and a flurry of activity behind the scenes, but little substantial change. Users will still be dealing with multiple providers, networks and support centers, even if they have one pretty-sounding marketing name, like GlobalOne, WorldPartners or Concert.

Don't expect a sprint to the finish line from these companies, either. Some factors will sap the energy from even the fittest of the fit:

1. Setting the rules. Even though the industry is moving toward greater competition, continued ambiguity of the rules — such as what types of resale are allowed — will keep the pace of reform slow. The investment necessary for huge partnerships such as WorldPartners, Concert and GlobalOne is heavily influenced by the exact interpretation and implementation of regulations, and until regulations are finalized, caution will be the watchword.

2. The pace of technological change. While most such change is rapid, changes to "customer-facing" systems always take time and money. These billing, customer sup-

your breath

port, network management and sales support systems take years and millions of dollars to implement. Typically, the investments are made reluctantly, without clear rules as to how services can be provided and charged for, and therefore billed.

3. Uneven application. As recent spats between the U.S. and other carriers in the WTO telecom talks show, telecommunications reform on a global basis is a politically charged issue. Each country will have its own interpretation of what "fairness" will entail, and rules will vary from country to country. These inconsistencies will contribute to the slow adoption of true global solutions. And it's not just Third World and Asian countries that are attempting to protect their home markets, either; Western countries such as Portugal and Austria are also dragging their feet on adopting "open skies" telecom policy.

For large multinational companies with many overseas operations, changes in regulatory rules will allow major carriers to implement custom systems, such as virtual private networks based on a single network architecture and supported by resale of private lines. Smaller firms should not expect an immediate flood of improvements. However, they will be able to find some good deals on international connectivity from smaller global providers, such as Telegroup, Inc. in Fairfield, Iowa, and Viatel, Inc. in New York.

As corporate managers look at this uncertain international marketplace, they should keep in mind that this market is changing rapidly. Much domestic telecom technology has become mature, but that isn't true of the international market. Understanding the offers available, keeping abreast of new services and providers, and keeping options open during negotiations as the market develops will allow corporations to take advantage of the best that competition has to offer. ●

→ **BRIERE** *is president of Telechoice, Inc., a Verona, N.J.-based telecommunications consultancy. He can be reached at dbriere@telechoice.com.*

Photo: John Rae/Photoillustration: Eric Pearl

SOLUTIONS BUILDING/CAMPUS SOLUTIONS HOME OFFICE

How fast is the 28.8 modem in your combo PC Card?

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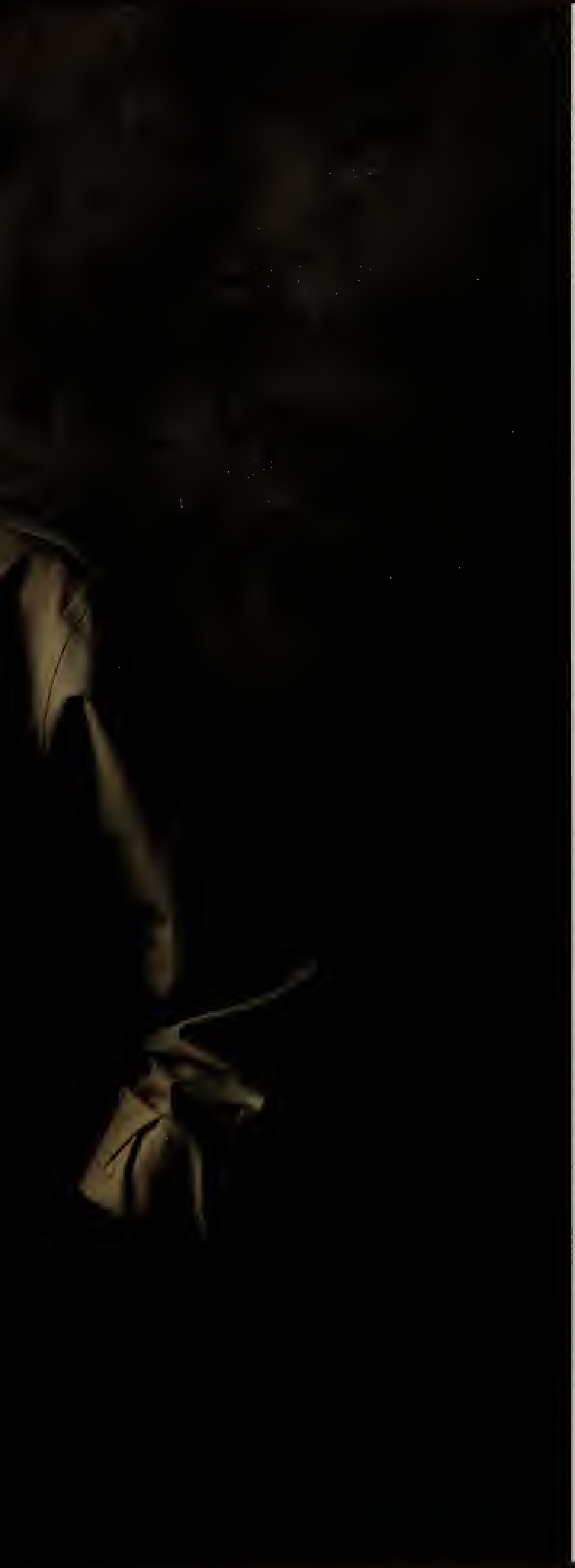

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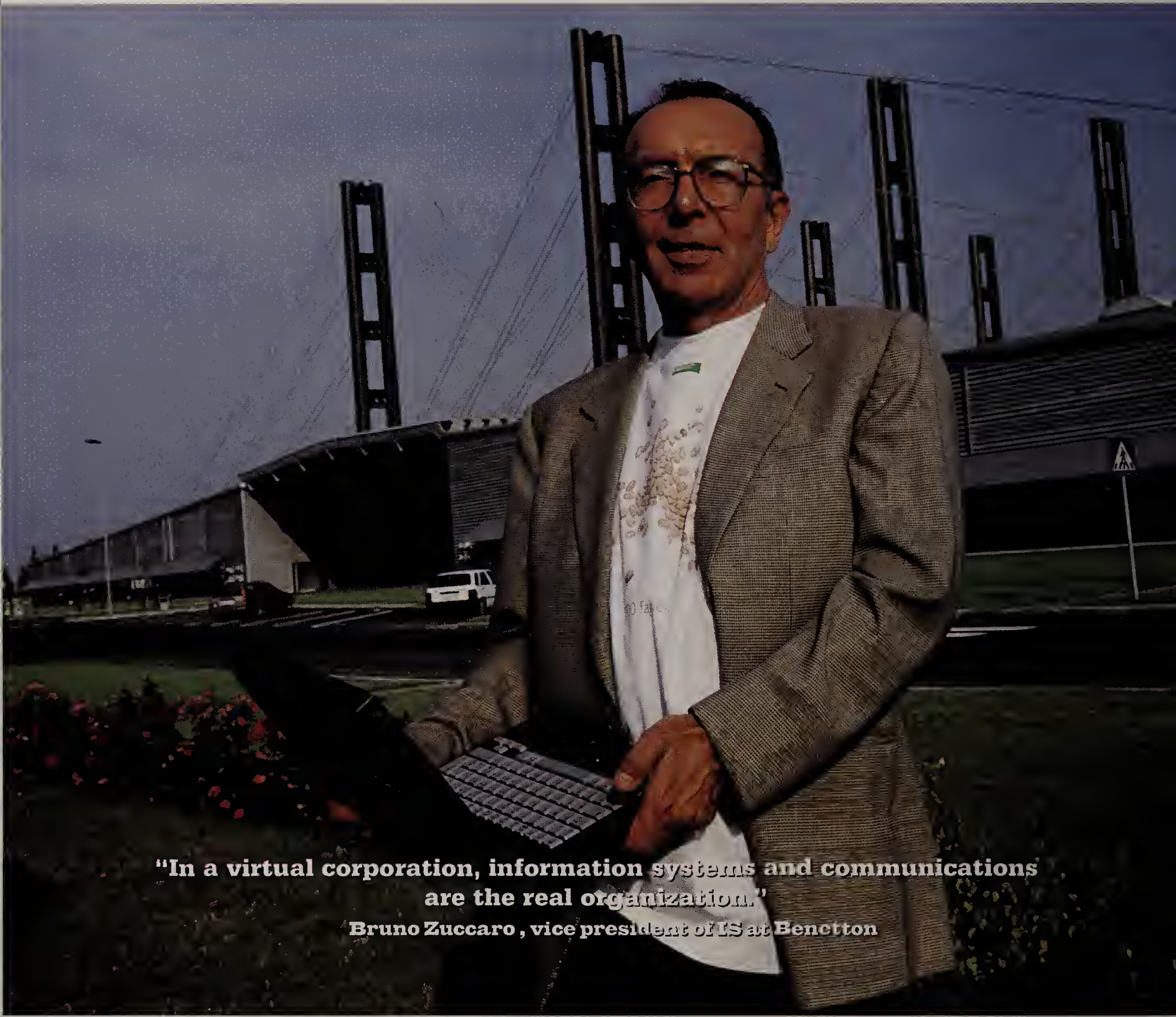
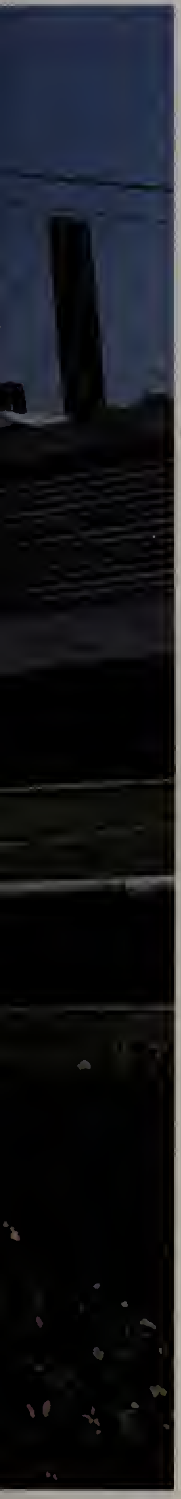


"In a virtual corporation, information systems and communications are the real organization."

Bruno Zuccaro, vice president of IS at Benetton



Enrico Bossan/SABA

right here, **right now**

By Elisabeth Horwitt and Ron Condon

ZERO DISTANCE BETWEEN USERS. That was the call to arms at Black & Veatch Corp., the $1.1 billion global engineer and constructor, as it built a global network during the past decade. Making sense of the labyrinth of leased lines and VSAT connecting 6,000 PCs and 6,100 professionals in 80 offices worldwide was a challenge. The

Alex McKnight

slogan helped focus the information systems staff on the task at hand; it also makes a good rallying cry for any IS department struggling to globalize its network.

There's no question that removing the distance barrier is the next frontier for many international organizations. A design engineer 7,000 miles away needs the same information as the marketing executive at company headquarters. In the same interface. At the same time. Now.

Of course, not all companies approach the task of connecting far-flung operations the same way. Cultural differences among companies and regions of the world ensure that. But surveying a handful of global networking innovators in the U.S. and Europe reveals some common themes — and some differences — in the quest for zero distance between users.

WHY GET CONNECTED?

Higher productivity. Kansas City, Mo., home of Black & Veatch (B&V), is a long way from the island of Pagbilao in the South Philippines. Which, in turn, is a long way from civilization — and not just the 100 miles to Manila. Engineers who traveled by small boat to the island to build a power plant found people who lived in grass huts, says Greg Moore, network manager. Facilities were limited, at best: "They only had diesel-generated electricity. The only water was desalinated. And the only communications were cellular," he recalls.

It took a combination of a satellite-based VSAT network from Pagbilao to Manila and terrestrial connections from there to Kansas City to provide an adequate communications infrastructure for the island site, Moore says.

Such links are well worth the trouble. For one thing, they give B&V project teams access to PowrTrak. The decade-old, constantly evolving system gives engineers in remote locations access to computer-aided engineering, project control and engineering design applications and a huge repository of data and designs. By drawing on the experience of their peers and past projects — using past designs as building blocks for current, similar projects, for example — B&V engineers can significantly lower turnaround time and costs.

Take the recent construction of a power plant in Michigan. Using PowrTrak reduced the number of change orders from an average of 3,500 to just two — yes, two, Moore says. At $10,000 per change order, that's an estimated $35 million saved because the plant was designed right the first time.

B&V is broadening PowrTrak to include electronic data interchange connections so it can communicate with business, in addition to design, partners. The links will "connect us not

CSX's John Andrews *says moving to one global carrier would centralize negotiations across borders* only with development partners and construction people but banks, suppliers and insurance companies — anyone who is involved in power plant construction," Moore says.

Central control. For Benetton Group SPA, the Italian clothing and accessories company, the remote location that had to be networked was headquarters itself. Housed in a 17th-century castle in the town of Ponzano, Italy, Benetton's headquarters bridges the ancient and the modern. The clothier is run as a virtual company, in which sales agents and manufacturing operations are dispersed around the world, says Bruno Zuccaro, vice president of information systems.

By using multilingual client/server applications over outsourced value-added networks that connect 30 countries, the 120 participating companies can exchange information on clients, orders and products. At headquarters, a Token Ring network over a fiber-optic backbone carries office traffic, such as clothing designs that the staff digitize and send to manufacturing plants over an Ethernet connection. "In a virtual corporation, information systems and communications are the real organization," Zuccaro says. "Communication enables us to manage all the world from this little village near Venice. We don't have to be in New York or Tokyo."

Knowledge dissemination. In the pharmaceutical industry, any improvement in communications with doctors, testing laboratories, suppliers and distributors can translate into savings and competitive advantage, says William Hoffman, project manager of electronic messaging at SmithKline Beecham PLC. Recently, however, the U.K.-based company has found a new role for its global network: collecting and disseminating information to the pharmaceutical and health care organizations that are its customers.

As a drug manufacturer, SmithKline collects huge volumes of information based on shipments and customer feedback, Hoffman reports. The company's global messaging network provides a vehicle for collecting that information efficiently and accurately. SmithKline then compiles that data, analyzes it and identifies key trends and statistics, such as the increasing demand for a particular drug or an unusually high incidence of a particular side effect. The network can then disseminate that information back to customers quickly and reliably, either as a value-added service or, increasingly, as a product that customers pay for.

Toward that end, a unified messaging infrastructure that will support a broad range of communications media and services has been in the works for several years. Now, through an open messaging infrastructure based on Simple Mail Transfer Protocol (SMTP) and X.400, the company is close to its goal. "The immediate pressure is for people to communicate with outside companies, everyone from advertising consultants to pharmaceutical suppliers," Hoffman says. The goal: a seamless, reliable, efficient flow of information that supports the end-to-end process of manufacturing, delivering and marketing pharmaceuticals. ➤

Steven Curtis

➤ **B&V's Greg Moore:** *'The biggest questions are of ownership of connections' between B&V and its overseas partners*

➸ **Customer connections.** For CSX Transportation, Inc., the Internet is the newest vehicle of choice for improving customer contact. The Jacksonville, Fla.-based rail carrier is working to provide its customers with direct access to information about their shipments along its 18,000-plus miles of domestic track.

Seven of the company's largest customers are piloting an Internet-based version of CSX's Transportation Workstation, a front end that allows CSX employees "to graphically monitor shipments, trace them, find contents of shipments and look up price schedules," says John Andrews, president of CSX Technology, Inc. and senior vice president of technology at CSX Transportation; both are subsidiaries of CSX Corp. The service will enable corporate customers to check on the status of their shipments more quickly and cut costs by eliminating the CSX middleman. CSX is also testing a beta version of an Internet appliance, a barebones workstation with a World Wide Web browser, as a possible client for the service.

WEB WORRIES

While some companies are rushing to embrace the Internet, many firms still distrust it for business applications. Swissair runs a Web site with flight times, but "there is no use of the Internet for operational applications," such as those that communicate between booking systems, the airlines and the aircraft, says Edi Kaufmann, head of networking at Swissair. Those functions run on a private network. The Internet "is not reliable enough, the performance is not stable and, for operational purposes, it is not possible," he says.

That concern is echoed by Ken Garrod, managing director at Barclays Technology Services, the information technology company for international banking firm Barclays PLC. "We need to see how the Internet is going to evolve," Garrod says. "The security issues need to be resolved. It's possible that the Internet could split into two: a truly commercial superhighway and a global worldwide advertising network."

Intranets — internal networks that use Internet technologies — seem to have more universal appeal than a movement into electronic commerce, at least right now. CSX is in the process of implementing a standardized internal communications infrastructure based on Web browsers, Web servers, Usenet news servers, SMTP electronic mail and TCP/IP, Andrews says. Its purpose is to "increase an employee's ability to locate the correct piece of information or appropriate person independent of where they reside across the globe," he says. That is, zero distance between users. ●

➾ **HORWITT** *is a freelance writer and consultant in Newton, Mass.*
CONDON *is London correspondent for the IDG News Service. He can be contacted at ronzo@cix.compulink.co.uk.*

Commentary

BY Leonard Kleinrock

Assembling

WE ARE BECOMING a world of plugged-in corporate nomads. More than 25% of PC sales this year will be laptops. Nomads travel anywhere and expect to be able to connect to the full complement of information technology resources that they have back home on their desktop.

At the same time, the world is becoming connected — the nomads are becoming a tribe. Through the Internet and the World Wide Web, we are enabling that tribe to connect their powerful portable platforms through a rich global network in which information is virtually free and immediacy is the standard.

But while "nomadicity" is an emerging paradigm, many enabling technologies are holding us back from realizing the full benefits. Indeed, the technologies can be more burdensome than liberating. At the same time, we all suffer from "feature shock." Most of us can't operate our VCRs, let alone understand all the functions of the latest spreadsheet, personal digital assistant (PDA) or the overwhelming options of surfing the Web.

I'm a prime example. When I travel — which is often — I typically carry a notebook computer, a cellular phone, a PDA and a pager. I often feel like Pancho Villa loaded down with all this paraphernalia, heading off to do battle with the U.S. Cavalry.

The challenge to the system designers and vendors today is to simplify the nomad's life. They must start to provide a transparent and integrated set of computing and communications capabilities and services for the nomad. I'd like the system to allow me continuous interaction with my applications and not force me to concern myself with details regarding my location; the particular communications device I am using — PCMCIA modem, cellular and so forth; the bandwidth I happen to encounter, be it 100 M bit/sec. or 0 bit/sec.; the computing platform I happen to be using; and whether or not I'm in motion.

the tribe

For example, I don't want to be bothered as the system adjusts itself to the best available communication medium; just give me the impression of continuous connectivity. If I initiate an operation such as a file update or the transmission of an E-mail message and the system chooses to defer that operation for its own reasons (lousy connectivity at the moment), I shouldn't be pestered with that fact.

But we are a far cry from that state. Instead of an integrated support system for the nomad, we're seeing rollouts of unrelated niche products. Most of the notebooks, PDAs, palmtops, pagers, cellular phones, Cellular Digital Packet Data systems, personal communication systems and personal information management systems on the market fail when it comes to interoperability.

Nomadicity is an emerging fact of life, and it is clear that our physical and logical IT infrastructure must be extended to support this mobility in a variety of ways. The needs are real, and the payoffs in terms of productivity can be huge.

But confusion reigns. And it will continue to reign until we face up to the integration challenge. The computing and communications industries must think in terms of developing products that are enabled for nomadicity. To accomplish that, we need an architectural model for nomadicity. Once that architecture is defined, we must develop the protocols that provide transparent, virtual connectivity for the nomad. The industry will have to agree on a set of standards to support those protocols, and product offerings should conform to those standards.

The time is ripe to create an industry forum that begins to consider those issues. If we fail to account for nomads at this early stage, we will seriously inhibit our ability to meet their needs of the nomad. ●

➾ KLEINROCK, *a founding father of the Internet, is a professor of computer science at UCLA, president of Nomadix LLC and chairman of the TechnologyTransfer Institute. He can be reached at lk@CS.UCLA.EDU.*

Photo: Lara Jo Regan/SABA/Photoillustration: Eric Pearl

PROGRESS *in the* **People's Republic**

CONTROL Central

★ Technology comes but cautiously to China, where the government holds the purse strings. But fledgling networks are leading the march into the future.

By Anna Foley

CHINA IS A LAND of stark contrasts. From barren Mongolian steppes to booming centers of trade, China's population of 1.2 billion is at once progressive and traditional. The country's networking infrastructure mirrors this diversity.

On the one hand are thriving commercial centers such as Shanghai, Guangzhou and Shenzhen. All three have trial Asynchronous Transfer Mode (ATM) networks in place and plan new, innovative services. Elsewhere, however, end users must make do with public X.25 packet-switched networks for wide-area communications, or leased digital circuits that, in most cases, run at less than 2M bit/sec. They have little hope of moving to higher-speed technologies in the near future.

Developing countries are usually characterized by rudimentary communications infrastructures. But for that very reason, they are also often touted as ideal candidates for leapfrogging more advanced neighbors in adopting leading-edge technology. China is no exception.

"China is like a blank piece of paper, and Chinese people like to take the best of whatever they can. So many organizations are constructing their buildings with state-of-the-art networking in mind," says Nanying Yin, Bay Networks, Inc.'s ATM Forum representative in China.

THE COMMUNIST WAY

But China's economy isn't market-driven. Government planning and funding drive development of the network infrastructure and companies' adoption of advanced technology.

That presents problems for some firms. The government's view is that the development of the network infrastructure must be centrally controlled; with the country's limited resources, market-led development can't be allowed, notes one Western diplomat in China. In addition, he says, there's a general lack of understanding of technologies such as ATM. "It's one thing to say Chinese companies are leapfrogging the rest of the world. If they don't know how to use what they've got, then they're not leapfrogging," he says.

China has only recently installed its three national datacom networks — Chinapac, Chinaddn and Chinanet. All can be upgraded to run ATM traffic, but Chinese officials are likely to want to recoup their initial investment before committing additional funds, says Lynn Crisanti, an analyst at International Data Corp. in Beijing.

Officials from the Center for Information Infrastructure and Economic Development at the Chinese Academy of Sciences estimate that the government will need to spend $50 billion over the next five years to upgrade China's public voice network alone.

In some areas of China, however, isolated municipal authorities and telecom providers are embracing broadband ATM as a potential money spinner. Pockets of state-of-the-art network use are springing up in prosperous regions around Shanghai and in Guangdong Province, which borders Hong Kong. Those installations are providing models for other cities to follow.

When we go to work, we work on
think about switching. When we t
switching. When we eat dinner, we
about our future, we talk about sw
we go on and on about switching. Whe

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witching. When we eat breakfast, we
ke customers to lunch, we talk about
talk about switching. When we talk
tching. When we talk to our friends,
we go to bed, we dream about switching.

Should you
come to us for
switching?

Yes.

Should you
come to us for
a wild time on
Friday night?

Probably not.

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NETWORKS THAT GO THE DISTANCE

Shanghai. "The Ministry of Posts and Telecommunications encourages local PTTs [postal, telephone and telegraph agencies] to develop new services in line with their standards, although they don't give us any money for them," says Zhang Wei Hua, vice president of the Shanghai Posts and Telecom Administration (PTA).

Zhang says the Shanghai PTA has been testing ATM-based videoconferencing services between the municipal governments of Pudong and Puxi since the end of 1995. It has also installed high-speed LAN-to-LAN connections to Jiaotong University. The services run on IBM switching equipment.

The next step will be to extend ATM service to high-income residential areas, laying a combination of fiber to the curb to buildings and hotels, Hua says. Applications will include videoconferencing and entertainment services such as karaoke-on-demand and video-on-demand. But the PTA expects to face some broadcast regulatory issues before the commercial launch can go ahead, Zhang says.

★ **A municipal project in Shanghai will provide access to databases and online services by 2010. A firewall will shield citizens from the Internet.**

The PTA's ATM backbone will also form the basis for future communications in Shanghai Infoport, an ambitious municipal information infrastructure project. Due for completion by 2010, Infoport is to provide access to nine private online multimedia databases that offer services such as finance, insurance, statistics and trade and to Shanghai On-Line, a public information network that offers access to a variety of domestic and international information systems, Zhang says.

In line with China's overriding goal of sheltering citizens from so-called harmful Internet content, however, Infoport plans to use a firewall between Shanghai On-Line and the Internet.

Guangdong province. John Ure, director of the Telecommunications Research Project at the University of Hong Kong's Center of Asian Studies, says that, as a region, Guangdong Province in the south of China is moving ahead of Shanghai. That's because advanced networking initiatives are starting to take off provincewide.

For example, based on desktop ATM equipment from First Virtual Corp., Guangzhou Huamei Communications has been piloting ATM-based videoconferencing links across the provincial capital of Guangzhou since 1995. By contrast, in Shenzhen, the city government plans to pilot videoconferencing among 33 government bureaus by next July.

Huamei — a joint venture between U.S. partnership SCM/Brooks Telecom and a subsidiary of China's Commission of Science, Technology and Industry for National Defense — was established in 1993. It uses AT&T and General Datacom ATM equipment to provide broadband services around the city over the Guangdong PTA's fiber backbone.

The target market for Huamei's full-service network is hotels and associated office and residential blocks, says Gary Savage, Huamei's acting chief operating officer and a Brooks executive vice president. For economic and regulatory reasons, urban commercial complexes have tended to grow up around hotel sites.

Savage's plan is to offer on-screen tourist information and near-video-on-demand to hotel guests and residents. It also plans videoconferencing in business centers with links to Beijing and, ultimately, international locations. "We're aiming to be in two or three hotels, serving roughly 1,300 rooms, by the end of 1997 and in 100 hotels and 40,000 rooms by 2002," he says.

Despite detailed business plans and the experience of a U.S. partner, such ventures run the risk of investing in a state-of-the-art network and then finding few subscribers to generate income.

The challenges are both political and economic. But for the most part, China analysts agree, now that the doors to technology innovation have been opened, they can't be closed again. ●

GREG KIGER/SABA

Huamei's Gary Savage *plans to offer on-screen tourist information and near-video-on-demand to hotel guests and residents*

FOLEY *is associate editor at* Computerworld Hong Kong.

’net around the world

Hello?
Hello?

SUSAN LEVAN

No borders, no boundaries. From Finland to Brazil, companies are leveraging the Internet and the World Wide Web to boost their bottom line.

Geffen Records: An intranet keeps this studio putting on the hits. Page 32.

Times of India: It's intranet time at India's largest daily newspaper. Page 32.

ABB: Engineers can't buy turbines on the ’net, but they can connect. Page 34.

Bradesco: The ’net forges worldwide frontiers for a Brazilian bank. Page 34.

Schwab: Bull market today? Do some trading online. Page 36.

Merita: How a Finnish bank enables direct payment over the Web. Page 36.

Seeking all the hits

Rock ’n’ roll and . . . information technology. It’s a combination that wouldn’t have meant anything to Buddy Holly or Janis Joplin. But at Geffen Records, IT is a central part of the rock ’n’ roll mix, both on the face the company presents to the public via a World Wide Web site and internally, with an intranet.

That intranet, used for notes, plans, reports and dozens of what would usually be paper-based documents, is extraordinarily effective, executives say. “Finding stuff on paper is really hard, but on the intranet it’s a lot easier,” says Doug Fenske, assistant to Jim Griffin, vice president of the technology department. “You know where the information is without having to go through lots of people.”

The intranet supports Geffen’s corporate culture, too. Besides the usual electronic-mail services and corporate news, the intranet boasts a large number of local restaurant menus. Late-night munchies and lunches out are apparently part of the scene in the record biz.

Geffen wasn’t always so cutting-edge, however.

When Griffin joined the company at the start of 1993, it not only didn’t have an Internet connection, it didn’t even have a LAN. Then, online services such as CompuServe let the “cat out of the bag — [staff] were finding useful information online, and they began to demand access to the outside world,” he says. His first mission, Griffin decided, was to develop a technology department that would provide more than just network services.

Naturally, one of the first things the group did was set up a Web server. Its site (http://www.geffen.com), which Griffin says was the first established by a recording company, promotes Geffen’s repertory of artists and lets visitors sample new releases, find out about their favorite bands and even send fan mail. It’s also used to recruit artists, who tour the technology department when they visit the company.

On the internal side, Geffen’s technology group had first looked at client/server to see if that architecture made

The Times, they are a-changin’

India’s largest newspaper blazes new trails with one of the first intranets in the country

HERE’S A REASON to set up an intranet: collaborative thinking.

That’s one thing A. K. Peter says drove *The Times of India* to take the intranet route. The New Delhi-based *Times*, the country’s leading English-language news daily, launched its intranet application just last month. It is probably India’s first such major intranet application.

“If somebody wants to say something, he or she can put it down on the home page. If anybody wants to react to it, they can do so,” says Peter, general manager of information services at *The Times*, the flagship of heavyweight publishing group Bennett, Coleman & Co. Ltd. “It will ultimately boil down to a very efficient information system.”

The Times’ home page on the World Wide Web (http://www.cyberindia.net/timesofindia/home.htm) features news and general information about the newspaper and its sister publications. The intranet includes internal information in areas such as marketing and finance; it is restricted to employees.

One major use of the intranet will be conducting quarterly business reviews of the 30-plus offices nationwide. “The Web-based intranet will enable sense. It concluded that it didn't. "With client/server you gather information, process [it] and distribute [it] — it takes too long," says Griffin. "We put the tools in their hands: Better we should teach them to fish than fish for them."

That's what led Griffin the way of an intranet, a setup that brings the Internet down to the desktop and allows any user in any department to create and manage the information themselves. (Firewalls based on custom systems control access between the Internet and the intranet.) The intranet is based on a central network at Geffen's headquarters in Los Angeles, the location of the company's main Internet gateway. From there, the intranet has links to London, New York, Chicago and Atlanta as well as 30 field offices that support about 225 users.

The intranet's ease of use is an important aspect, Fenske says. "When I came to this company, all I knew about was Windows 3.1. But learning to use our intranet was easy, and I can find out anything about our business that I need to know," he says.

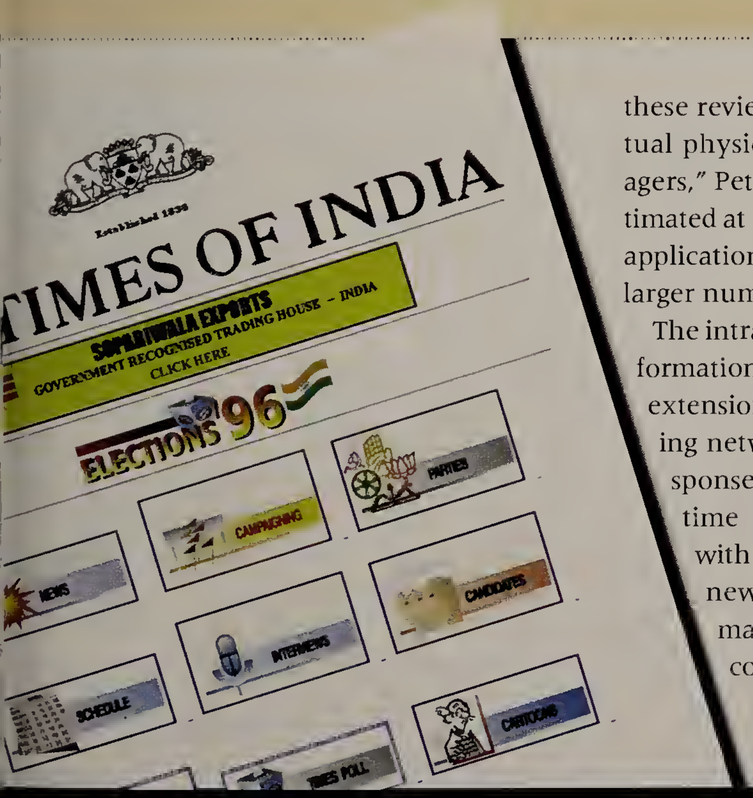
"I think that one of the ways to find out if you are doing a good job with your intranet is to ask people in your organization who is responsible for the Web server. If they answer, 'the technical department,' you're probably not doing a good job," says Griffin. "People should say, 'me' — they have to take ownership."

For the future, Griffin says, "the objective isn't just faster and cheaper; it's focusing on doing things with the Internet and intranet that haven't been done before." Kind of like the challenge to musicians everywhere. ●

BY MARK GIBBS, *a writer and consultant in Ventura, Calif. He can be reached at mgibbs@gibbs.com or (805) 644-4999.*

LARA JO REAGAN/SABA

Jim Griffin, *a Geffen vice president: 'We were the first recording company to have a Web site, and it wasn't very difficult at all'*



these reviews to take place without actual physical interaction among managers," Peter says. Initial savings are estimated at $20,000 but will rise once the application is implemented across a larger number of centers.

The intranet, the brainchild of the information services division, is a logical extension of the organization's existing network, RespNet (short for Response Network). RespNet is a real-time online information service with two large networks: one for news dissemination and information sharing and one for the company's revenue/commercial departments. One of the most important applications running on the company's 4-year-old WAN, RespNet enables advertisers and advertising agencies, for example, to obtain instantaneous scheduling updates and billing and accounting information for the many regional editions of the paper.

Company sources say the intranet is the future at *The Times* and will form the basis of all internal and global communications for the organization. "It will power the enterprise," Peter says. ●

BY VINITA CHAWLA, *editor of* Computerworld India.

Hitting the right Notes

ABB

Asea Brown Boveri Ltd., the biggest electrical-engineering company in the world, aims to leverage its global infrastructure to make optimum use of the Internet.

The other key part of its strategy: using the Internet capabilities of Lotus Development Corp.'s Notes 4.0. With 50,000 users (and eventually as many as 90,000), ABB's Lotus Notes setup is one of the most sophisticated anywhere.

Installation began about three years ago; the system now encompasses 750 dedicated Notes servers linked to five main worldwide network hubs. It has 300 dedicated administrators.

"Notes is a controlled and administered environment," says Bengt Skantze, group senior vice president and manager of group information systems. "And now, when I open Notes, I can click and get access to the Internet and stay within my controlled environment." That controlled environment lets ABB streamline overhead and standardize on basic communications software, even though the company is very decentralized.

Going to the Internet to exchange electronic mail and retrieve information is quite different, of course, from doing business on the World Wide Web, Skantze notes. Right now, ABB sees the Web as an information publishing medium, a way to communicate with the outside world and to steer potential suppliers and clients to the appropriate part of ABB's global empire.

Zurich-based, $30 billion ABB, born out of a merger of competing industry titans Asea AB and BBC Brown Boveri Ltd. in 1987, serves the electrical power generation, transmission and distribution markets, as well as industrial and rail transportation customers.

Its home page (http://www.abb.com) offers press releases, general information about the company and its products, and hyperlinks to individual company sites. Visitors can drill down to the level where local phone and fax numbers and sometimes E-mail links are available. But that's as far as the company is willing to go for now. "For us it's a bit more long

Banco Bradesco banks on the 'net

An 800-page Web site and home banking service put Brazilian institution in global eye

BANCO BRADESCO likes to be first. The largest private bank in Brazil, with assets of more than $20 billion, it was the first bank in the country to install computers in 1962. And in May 1995, it was the first Brazilian bank to go live on the World Wide Web.

The pioneering spirit to automate goes hand in hand with Bradesco's ambitious plans to be a global banking player and a domestic powerhouse. Consider that the bank has more than 20 million accounts, conducts 216 million transactions per month, adds 6,000 new accounts per day and spends about $200 million per year on information technology. "We wish to give our customers the quickest possible service," states Bradesco's CEO, Lazaro de Mello Brandao, in a recent company report.

Bradesco's site on the World Wide Web (http://www.bradesco.com.br) is part of Brandao's plan. Its more than 800 pages offer information on the bank's principal products and services, provide access to company reports and financial statements and offer access to a home banking network. The site received more than 100,000 hits in May

John Fox, *ABB manager of editorial services, says of the Web site launch: 'Everyone was out there doing their own thing, so we had to rein it in a bit'*

BENOIT DECOUT/SABA

term. We are not an insurance company — you don't buy a turbine on the Internet," Skantze notes.

But even simply publishing information on the group home page and maintaining the hyperlinks to local-company Web sites can be a complex task for a group of some 1,000 companies operating in 140 countries around the world.

"In the beginning, it was chaotic. Everyone was out there doing their own thing, so we had to rein it in a bit," recalls John Fox, manager of editorial services at ABB headquarters.

In keeping with the decentralized nature of the company, ABB has left it up to the local companies to decide whether, and to what extent, they want to transact business on the Web, Skantze says. Those choosing to participate must follow some basic guidelines to convey the sense of a global brand. The guidelines cover such elements as logo appearance and placement, and the ratio of logo size to hot-button size.

ABB companies are also studying possible uses of intranets, but Skantze says he's dubious that a worldwide intranet will be built. Proponents say an intranet would be less complex than Notes, but Skantze says Notes is sufficient as an intracompany communications system — and one environment is preferable to two. ●

BY MARC FERRANTI, *Paris bureau chief for the IDG News Service.*

— 84% percent from Latin America, but 3.3% from North America, 2% from Europe and the remainder from Australia and the Far East, says Odécio Grejo, the bank's technical director.

Bradesco spent about $200,000 during the initial phase of the Web project and recently injected another $400,000 to expand the Internet-based home banking service, according to Bradesco Executive Director Aluizio Borges.

The home banking service, called Bradesco Net, offers interactive banking 8 a.m. to 8 p.m. weekdays. Customers can transfer money between accounts, request home delivery of checks, schedule and pay bills, check balances, obtain account statements, manage investments and use their Bradesco/Visa credit cards. All commands in the environment are cryptographically protected.

Bradesco's next Web project: an intranet. It would be an alternative to the current electronic-mail system, which has 23,000 users and handles 24 million transactions per month. ●

RICARDO AZOURY/SABA

Aluizio Borges *says Bradesco spent about $200,000 in the initial phase of the Web project*

BY ERIVELTO TADEU, *executive editor of* Connections, *an IDG affiliate in Sao Paolo, Brazil.*

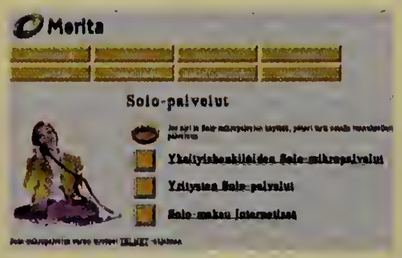
Merita

FINLAND LEADS THE WORLD in per-capita access points to the Internet. Yes, Finland. In fact, with only 24 people per 'net host, the nation blows away nearest competitors Sweden and Australia, which are tied with 59 people per access point, according to Killen & Associates in Palo Alto, Calif.

So maybe it's no surprise that Merita, the biggest bank in Finland, is one of the first banks in the world to offer electronic fund transfers directly from client to customer over the Internet. And Merita Bank Ltd. is also creating an intranet and planning to put other banking services on the 'net.

The Finns are a receptive lot for such experiments. "In all forms of networking, Finland is a kind of laboratory, and so Internet payment is the tip of the iceberg," says Kalevi Kontinen, the head of Merita data systems in Helsinki. Why? "The Finns are rather solitary and independent, and if anybody gives them a choice to do something themselves, they like to do it," he explains. "The Finns are also real techno-freaks, and they are quick to jump on the latest gadgets."

Merita's Internet payment service is connected to an electronic-cash system called E-cash. Provided by Netherlands-based service provider EUnet NV, it was developed by Digicash, Inc. in New York. Participating vendors display a button marked Solo on their payment screen.


Merita
Solo-palvelut
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To use the service, Web shoppers simply fill out the vendor's usual payment form and click on the Solo button. That brings up the Solo payment screen, on which users type in their account numbers and a one-time, four-digit code. When the user presses the "OK" button, Merita debits their bank account and credits the vendor account with the payment for the order. Right now, users must be customers of the bank, and due to international banking laws, both parties involved in the transactions must be in Finland. So far, 11 Internet vendors offer the Solo payment option, and 100 more have requested it.

Merita is further leveraging its Internet know-how to develop a user-friendly enterprisewide information system. Tests of the intranet will start in the third quarter, and users will be trained by the end of the year, Kontinen says. ●

BY MARC FERRANTI, *Paris bureau chief for the IDG News Service.*

Time is money,

and nobody knows that more than financial services companies. So when the Internet took off months before Charles Schwab's Web site was scheduled to debut, the company accelerated its program. Time to new site: three months, from concept to operation.

Schwab

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Schwab Online (http://www.schwab.com) executes stock trades and confirms them with the client within 60 seconds. It also tracks portfolios in either delayed or real-time mode, depending on the type of account. Clients must use a secure browser, such as Netscape Navigator or Microsoft Internet Explorer, so transactions can be kept private.

"Schwab has always believed that information technology is the best route to providing better service at lower cost — and the Internet is an ideal service medium," says Gideon Sasson, senior vice president of electronic brokerage technology at Schwab.

Schwab Online, the first service of its kind among the big brokerages such as Fidelity and Grubb & Ellis, debuted in March. It's not Schwab's first electronic effort, though. Schwab introduced a dial-up trading service, StreetSmart, in 1995; all its customers can use it, whether they have regular accounts or electronic E-Schwab accounts. (Regular accounts allow the use of branch offices and telephone-based services; E-Schwab accounts use online services only. The E-Schwab service carries a 10% discount on trading activities.) StreetSmart uses proprietary software; the Web-based brokerage uses back-end applications that Schwab can upgrade on the fly and enhance as needed.

Though it won't disclose numbers, the brokerage says Schwab Online is already profitable enough that the company is moving into the next round of development. The next iteration will add improved graphics and other features that Schwab officials are hesitant to discuss.

"You'll see Schwab focus more and more on the Internet as a way of providing increased value to our investors," Sasson says. "I don't think it's an issue anymore whether there will be an online economy — it's just a question of details and how fast it will happen. Financial services are going to lead in giving users a real reason to use the Internet." ●

BY MARK GIBBS, *a writer and consultant in Ventura, Calif. He can be reached at mgibbs@gibbs.com or (805) 644-4999.*

Commentary

BY Jan Hertzberg

Latin flavor

AS IN MANY PARTS OF THE WORLD, the popularity of the Internet in Latin America has grown dramatically. Large banks, government agencies and newspapers have been leading the way in offering services on the Web, and now many small entrepreneurs are starting to sell products over the 'net. Electronic malls, some operated in the U.S., provide a forum for businessmen to sell everything from tapes and CD-ROMs to specialty foods. One even has a directory of Brazilian restaurants.

But the greatest value of the Internet to Latin American businesses is not as a commercial medium. It is in providing a global communications infrastructure that will enable them to distribute and extend IT services, such as E-mail and distributed applications, to remote offices, distributors and business partners. Unlike U.S. carriers, Latin telcos have traditionally offered unreliable and expensive data and voice communications services. If used as part of an overall IT strategy, the Internet will eventually help level the playing field by providing global, reliable services at a fraction of the cost of private data networks.

But while the Internet holds great promise, there are some significant inhibitors:

- In many Latin countries, universal access is far from universal and robust telco infrastructure remains spotty.
- To date, Internet usage costs in Latin America have remained high, especially compared with those in the U.S., due in large part to expensive local dialing rates.
- Latin American businesses often lack the back-end links that allow them to easily exchange transactions with one another. In the U.S. and elsewhere, transaction networks are the workhorses that facilitate the exchange of purchase orders, invoices and other documents.
- Significant language and cultural obstacles must be overcome to make Latin American Web sites attractive to non-Latin users. At a minimum, home pages must be available in English, the lingua franca of the Internet.

In time, many of these obstacles will be addressed. With the privatization of national communications infrastructures and the entrance of large, global Internet service providers in the region, competition will force improvements in service and reduce prices. Transactions will be made easier through common Internet procotols, improved systems integration and Web application development tools. Those tools will also enable Web developers to create applications in different languages, enhancing their appeal. ●

HERTZBERG *is a manager for the Center for Technology Enablement at Ernst & Young in Chicago. He can be reached at Jan.Hertzberg@ey.com.*

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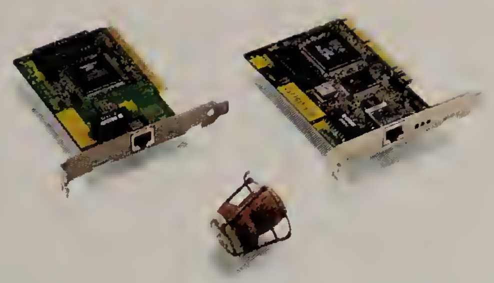

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extreme

From the South China Sea to Egypt's Sahara Desert, an oil company must have seamless communication around the globe. It's the price of doing business.

ON AN OIL PLATFORM 300 miles off Mexico in seas thousands of feet deep, Amoco Corp. networking technicians quietly installed the future. It was late 1994, and the future took the form of floating, high-end servers and networking gear that could talk to a NASA test satellite.

The mission: To beam multimedia seismic data collected from beneath the ocean floor directly to supercomputers in the U.S. at T1 (1.54M bit/sec.) speeds in a special demon-

BY **Joanie Wexler**

stration for the federal government and the public. In production mode, this system would save Amoco millions of dollars by speeding up data collection decisions and ultimately allowing the $30 billion firm to re-engineer the way it dispatches ships for more accurate drilling.

The event marked the birth of an industry-pioneering project to unite users, equipment makers and network service providers in perfecting the much-hyped, but little-deployed, Asynchronous Transfer Mode (ATM) technology. ATM is a high-speed packet-switching technology that packs bits into fixed-length cells.

Conceived to run at 45M bit/sec. and faster, ATM is often viewed as nirvana for mixing voice, data and video onto one network. One primary appeal of ATM applications like Amoco's: Equipment scales easily and inexpensively to higher speeds as traffic expands, says Carl Williams, Amoco's chief information officer.

Since the the Gulf of Mexico demonstration, the Amoco project, dubbed the ATM Research and Industrial Enterprise Study, or ARIES, has produced two other demos and grown to include the entire petroleum industry, which hopes to collectively save tens of millions of dollars one day by using ATM technology.

In the second demo, in the fall of 1995, also from the fixed platform in the Gulf, the speed of the transmission link jumped hundredfold, to 155M bit/sec. And this past February, the group demonstrated the shipment of seismologic data gathered off a moving vessel in the Gulf of Mexico to the Minnesota Supercomputing Center in Minneapolis. Because the vessel was moving, the speed of running the ATM protocol over NASA satellite links dropped to 2M bit/sec. The first demonstration used a General DataComm Corp. Apex ATM switch with a T1 interface, but subsequent trials used Fore Systems, Inc. ASX 200 switches with higher-speed interfaces, says David Beering, a senior staff telecommunications analyst at Amoco.

AMOCO HASN'T LIMITED its trailblazing networking efforts to ARIES. With operations that stretch from the frigid North Sea to the Egyptian desert, Amoco has also been instrumental in helping bring new services to out-of-the-way places. ➽

PAUL ELLEDGE

➳ **Amoco has embarked on a two-year plan to move to an ATM switched network. "We hope to reduce complexity by collapsing many networks into one." — CARL WILLIAMS**

➳ The company has used its clout in other countries and their phone companies, for example, to test new network services. One result: commercial Integrated Services Digital Network in Malaysia.

In oil-rich Egypt, Norway, Trinidad and Tobago, where Amoco has large operations, the company "purchased earth stations with more capacity than we needed" and is reselling services to others, says Alex Gonzalez, manager of Amoco's international communications. Gonzalez manages satellite networks that serve 16 countries and run at speeds up of to T1.

Private satellite and terrestrial nets have often been more cost-effective in many parts of the world where monopoly phone companies reign. Gonzalez estimates the company saves at least 50% by running private lines and compressing traffic.

Where public services are economical, Gonzalez has deemed frame relay the Amoco standard. He uses services from Concert — a joint venture between MCI Communications Corp. and British Telecommunications PLC — in Hong Kong, the location of the company's Far East chemical headquarters. He uses Scitor Corp., an international carrier, in Europe.

"No matter how remote workers are, you have to provide telecommunications services," Gonzalez says. In the South China Sea, for instance, floating platforms, tankers and facilities on the mainland communicate via microwave and satellite. The tankers run LANs and private branch exchanges (PBX) for communications.

Amoco has an unusual setup in the North Sea whereby it uses a scheme called tropospheric scatter to communicate wirelessly from Scotland to an oil platform. Tropospheric scatter is a point-to-point technology that works like microwave but isn't limited to line-of-sight transmission, Gonzalez explains. It can deliver communications as far as 500 miles by using Earth's troposphere as a big mirror to reflect signals between two points.

"This has the capability of connecting with various platforms and could provide a means of serving more than just Amoco" at some point, he says. U.K. carrier BT manages the network for Amoco, Gonzalez says.

ARIES is still the most dramatic example of Amoco's initiative to break ground with networking technologies that should eventually deliver significant payoffs for Amoco and others.

Under the tutelage of telecom analyst Beering, ARIES participants are weathering the bumps and bruises of equipment interoperability and applications testing with ATM suppliers, which include seven carriers and three switch-makers. Getting those growing pains out of the way will go a long way toward greater acceptance of the complex multimedia network.

ATM will slash seismologic decision making from weeks to hours, Beering says. Every month eliminated from a survey — and one can take months — saves about $200,000, Beering says. The industry runs several hundred surveys each year.

The goal is to transmit data — up to a terabyte per week — collected from underwater test equipment directly from exploration vessels to supercomputers. The data travels via high-speed ATM over satellite links from ship to shore, then over fiber for the terrestrial leg of the trip. "I see the [ARIES] network growing into a utility that eventually becomes an energy industry Internet," Beering says.

In addition to the ship-to-shore data transfer, ARIES is honing ATM gear into what will become a high-speed terrestrial backbone for the oil community, which Beering expects to be in place in about a year.

The modus operandi in the energy industry has traditionally been to store data on magnetic tapes that fill cratefuls by the time the ship docks. Then explorers send the piles of tapes via courier to a supercomputing center for processing. But the time-consuming task of converting data from tape to disk must happen first. It can take weeks or months from the time the data is collected for it to show up on the computer; all the while, oil vessels could be drilling in barren areas.

Transporting data to the supercomputers directly from a ship-based satellite dish should enable geophysicists to see where oil lurks and decide almost simultaneously where to send ships and how long to drill, the ARIES tests have shown.

In May, Amoco completed its internal ATM pilot and began a two-year plan to move the company off its time-division multiplexer (TDM) network in the U.S. and onto an ATM switched network. That will be the start of Amoco's "shift from a private wide-area network to networks based on public services," CIO Williams says.

The network goal, he says, is to "move bandwidth management headaches off our backbone into the carrier's" in an era when the World Wide Web, intranet access, Lotus Notes database replication, desktop videoconferencing and other applications stress bandwidth. "We hope to reduce complexity by collapsing many networks into one that is scalable [to higher speeds] simply by making a phone call to the carrier."

STARTING this summer, Amoco's Cisco Systems, Inc. router network will detach from the Network Equipment Technologies, Inc. IDNX T1 TDM backbone; LAN traffic will feed from the routers into ATM switches, Beering says. Later this year, the company plans to unplug its PBXs from the IDNX and send voice on its way over the public-switched telephone network.

And last but not least, the IBM 3275 and 3745 front-end processors will eventually drop off, no longer single-handedly cost-justifying an entire TDM network themselves; SNA will hop on the ATM net as well. At that point, Amoco sites in Chicago, Atlanta, Houston and Tulsa, Okla., will plug into an ATM "cloud," or public ATM network service.

"Carrier-based ATM has great potential for replacing TDM," says Tom Pecelunas, supervisor of network services at Amoco's Chicago headquarters. "The cost per bit over ATM is cheaper, and we now have significant expertise built up in-house with ATM" because of ARIES.

Pecelunas says a frame-relay/ATM hybrid net in the U.S. is on the horizon: Frame relay, which is optimized for data, will fit the bill for sites with low to medium traffic, and ATM will carry higher-speed applications for those that mix voice, video and data, he says.

Still, on a worldwide basis, getting uniformity across services is tough. Amoco Chemical Asia-Pacific in Kuantan, Malaysia, was a guinea pig for Telecom Malaysia frame-relay services, says Ken McDaniel, Amoco's information technology operations supervisor. "But we just couldn't get a reliable connection up," and the project has been put on the back burner, he says.

And in sub-Saharan Africa, virtually no data services exist, Gonzalez says, and satellite service is cost-prohibitive. The company runs only business offices there, and they communicate by the dial-up phone network. But knowing Amoco's commitment to technology and influence, many Africans might soon be conducting Notes-based collaborative data conferences. ●

WEXLER *is a senior editor at* NetworkWorld *in Sunnyvale, Calif. She can be reached at jwexler@nww.com.*

Brewing up
ARIES

HOW DID AMOCO become an Asynchronous Transfer Mode (ATM) junkie? As David Beering, a senior staff telecommunications analyst at Amoco, tells it, the saga officially began at the Gordon Biersch Brewery in San Francisco, a casual hot spot where Silicon Valley product plans take shape, engineers find jobs and rumors of industry intrigue are launched.

That is where "networking" — of the personal variety — paid off for Amoco.

Beering was seeking a high-performance network to hasten turnaround in the oil exploration business. Amoco spends between $4.5 billion and $5 billion annually on exploration, and he says he was convinced networking could slash those costs.

"When you want to compress time and distance, one way to do that with far-flung sites is satellite," Beering says.

He had a friend at NASA, which operates the $750 million, 622M bit/sec.-capable Advanced Communications Technology Satellite, and another at Sandia National Laboratories, the Department of Energy's research facility in Livermore, Calif. Beering and his Sandia acquaintance Ray Cline, then director of distributed computing, met at Gordon Biersch, drew the satellite model on a cocktail napkin and took the project to NASA.

Two years later, they had the $1 billion ARIES test network up and running. — ***Joanie Wexler***

> **"I see the [ARIES] network growing into a utility that eventually becomes an energy-industry Internet." — DAVID BEERING**

PAUL ELLEDGE

Remote | **POSSIBILITIES**

Networking a nation

Electronic banking is taking off in South Africa. One target audience: the 'unbanked' rural population

BY Simon Cashmore

THE TERRAIN of the KwaZulu Natal is hilly, with frequent mist and lush vegetation. The region's remote, rural communities have few, if any, modern services: Paved roads, running water and telephone service are rare. Political violence between members of the African National Congress (ANC) and those of the Inkatha Freedom Party has racked the area in recent years, resulting in banditry and bloody feuds between communities.

Until recently, a pension-payout vehicle would arrive every two months to give residents of retirement age (60 for women, 65 for men) their government stipend of 300 rand (about $67). Pensioners would wait for hours for the vehicles to arrive; then they'd wait some more as IDs were checked and verified.

A program called Cash Paymaster Services (CPS) from First National Bank has brought a piece of the late 20th century to all that. The pension vehicles that arrive now are security trucks outfitted with modified automated teller machines (ATM). And the lines move quickly: The ATMs identify pensioners by their thumbprints, so all a person needs to do is place his thumb on a biometric reader. The system also cuts down on fraud. Since it was introduced, the number of people who receive payments has dropped by 20%.

First National Bank's *pension payout vehicles include biometric readers that identify recipients by their thumbprints. The vehicles serve 500,000 retirees in KwaZulu Natal.*

CPS was pioneered by the bank in conjunction with local information technology group Datakor. The bank's most adventurous remote banking project, it has attracted considerable interest among regional and local government organizations eager to provide basic financial services to rural and largely illiterate communities.

The South African banking industry is undergoing a profound transformation driven by powerful social, economic and technological forces. Until recently, apartheid, poverty and high bank fees had excluded most blacks from the industry. For example, an ANC spokesman estimated that, until the general election last year, only 5% of the total value of housing mortgage bonds granted by banks had been awarded to blacks. He also estimated that less than 25% of adult blacks in metropolitan areas had ATM cards and that only 1% held a credit card. South Africa's black adult population is about 20 million; blacks account for 75% of South Africa's total population.

To this enormous "underbanked" population banks are launching extensive initiatives — access to loans, development funding, savings and investment mechanisms, and provision of cash payment and transaction facilities.

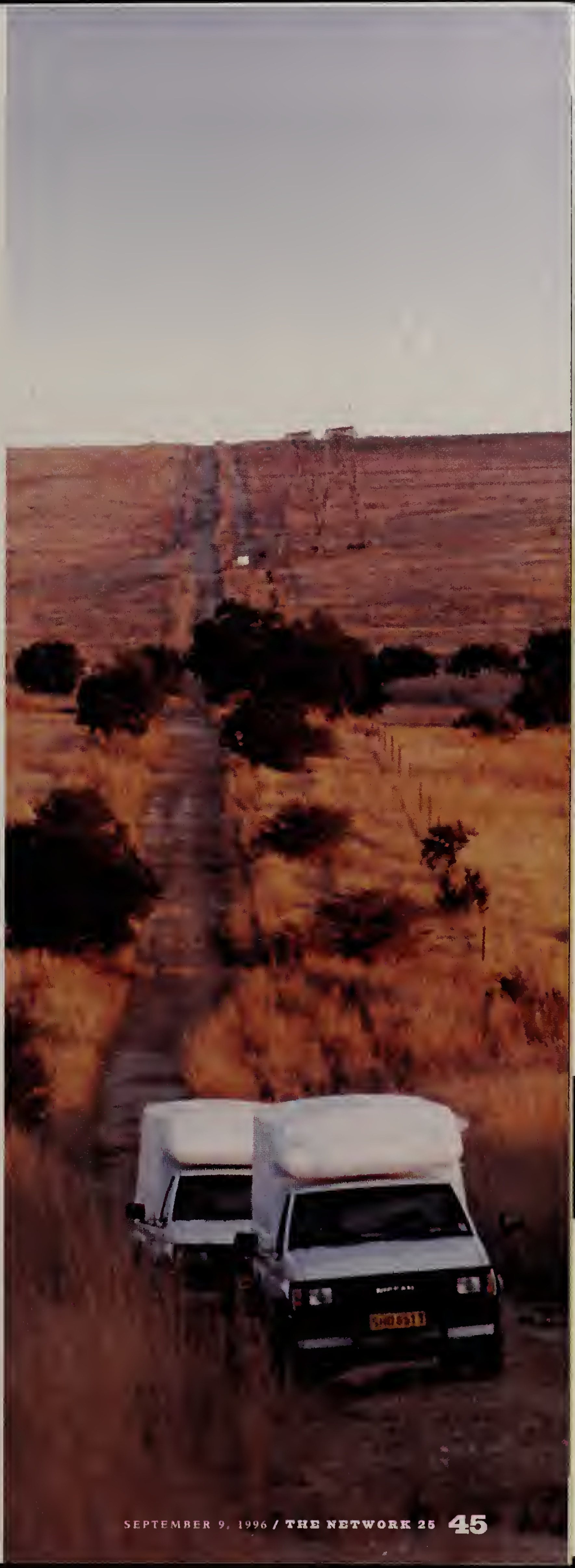
"While South Africa reflects world banking trends, we are also faced with uniquely local challenges. The bulk of the population is 'unbanked,' with 80% of all transactions still taking place in cash. So the challenge is to take banking to the people," says Mike Jarvis, First National Bank's general manager responsible for information technology. "The business of banking is all about information and being able to deliver that information where and when it is needed."

ON THE HORIZON

Outreach to the black community isn't the only challenge that faces South African banks. The need to broaden the range of personal and corporate services and counter increasing competition from local and international institutions is up there as well. The face of banking is changing. For the first time this year, for example, First National will generate more income from services and transaction fees than from its traditional lending business.

And bank services demand networking. ATMs, branches and remote banking devices on the premises of corporate customers have all become a part of doing business.

First National recently spent 250 million rand (about $56 million)to automate branch offices. The four-year project involved installing more than 10,000 IBM PS/2s and an OS/2 client/server environment at 620 branches; the PCs are interlinked at the branch level on Token Ring LANs and integrated into the bank's national network. The project enabled the bank to centralize routine back-office transaction processing operations so that counter staff, equipped with online systems, can spend their time selling products.



Security trucks *outfitted with modified automated teller machines make the trek to rural KwaZulu Natal to distribute government-funded pensions to retirees*

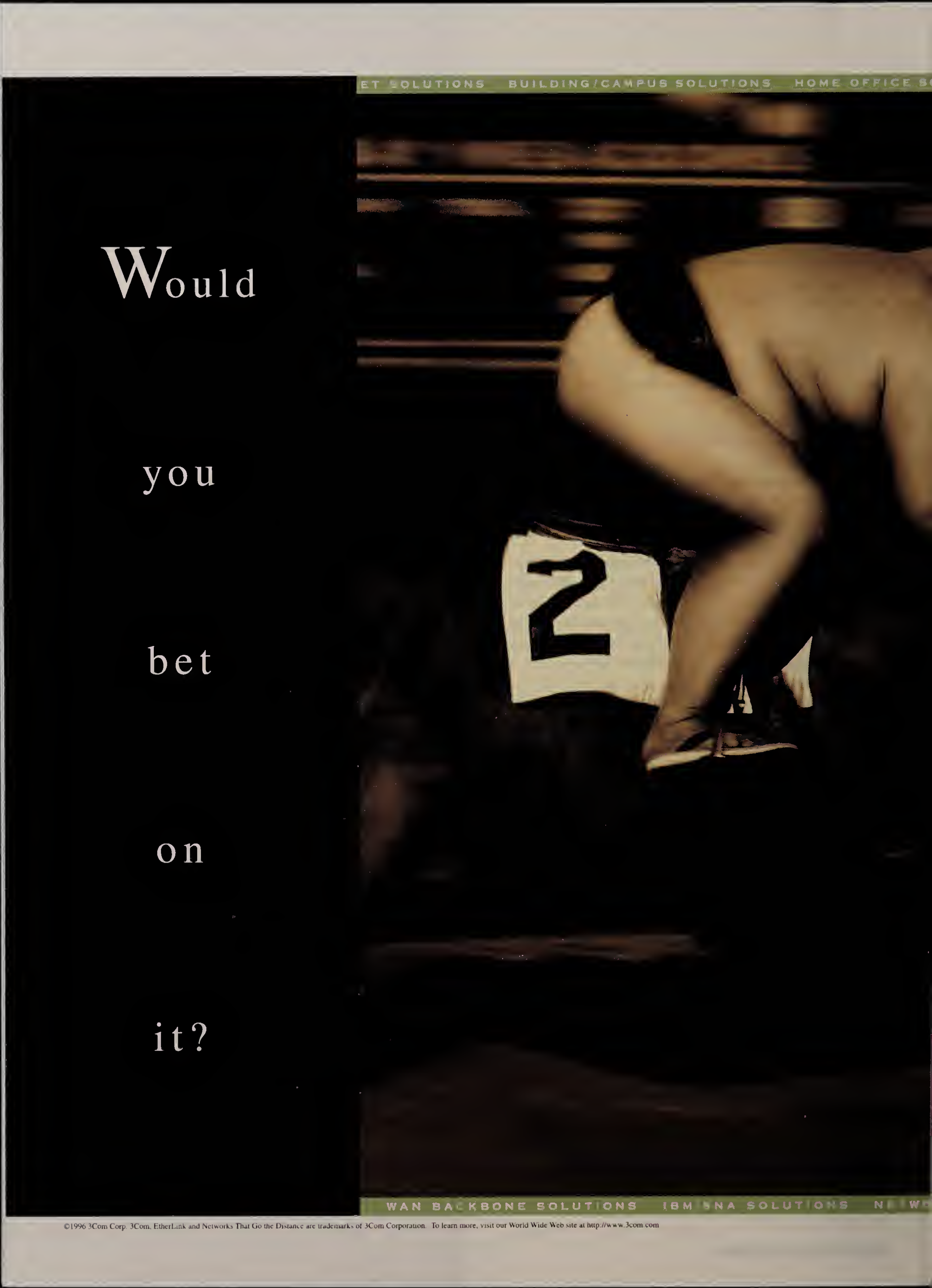
ON A WIDER SCALE

In some instances, the need to offer services has brought the industry together. And cooperation is growing. South Africa's Saswitch national ATM-sharing network enables a customer to access his account by using any of the 6,000 ATMs around the country, regardless of which financial institution holds the account.

Those ATMs are integral to the banking scheme of a nation where most transactions are still conducted in cash. Other services are sometimes a harder sell and call for some creative solutions. How do you approve a loan for someone who doesn't have a credit history? Examine their standing and accountability in the community instead. That's what First National Bank is doing.

It's a challenge. And a step toward economic progress. ●

CASHMORE, *a freelance information technology journalist, is a regular contributor to* Computing South Africa, *an IDG affiliate. He can be contacted at simon.cashmore@it-media.co.za.*



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NETWORKS THAT GO THE DISTANCE

THE NETWORK 25

The Network 25 are companies from around the world that use networking in innovative ways. This list, compiled by *Computerworld* and *Network World*, is not a ranking. However, all nominees were surveyed on their information systems and networking expenditures and asked for the breakdown of those budgets. Total spending was one of several factors used in selecting the 25 companies featured. Excerpts from the Network 25 survey results appear in the following charts.

Company	1995 IS spending	1995 network spending	IS staff	Networking staff
ABB	$850M	$250M	35,000	480
Amoco	$401M	$62M	2,409	128
Banco Bradesco	$334M	$112M	1,920	200
Barclays	$145M	NA	6,890	NA

NA=Not available

METHODOLOGY

The 25 companies on this list were selected through nominations by the editors of *Computerworld* and *Network World* in the U.S. and at sister publications overseas (see page 3). Any organization could be nominated except computer hardware, software and telecommunications companies.

Editors in the U.S. developed a set of seven technology areas by which editors from around the world could evaluate the companies (see page 7). Editors were asked to select companies they believed were outstanding in one or more of these areas and to provide some details for their nominations. Once the nominations were compiled, *Computerworld* researchers asked IS managers at the companies to provide more information for further evaluation. Companies with higher relative spending on networking, for example, were given greater weight.

Also, companies that refused to participate in the survey process were excluded from consideration. This requirement effectively eliminated a number of candidates, including the finalists from Japan.

While we were looking for outstanding companies, we also wanted a fair representation from around the world. Therefore, U.S. companies account for 24% of the list, Europe accounts for 36% and the rest of the world accounts for 40%.

It should be noted that this list is not a ranking, and it is not intended as a definitive list of the "best" networked companies in the world. Rather, it was compiled as a representative list of innovators that are applying networking technology.

Percent spent on LANs	Percent spent on WANs	Percent spent on Internet/ intranet
20%	5%	3%
7%	10%	1%
4%	80%	1%
NA	NA	NA

Snapshots

CEMEX

Jose Luis Luna, director of evolution and technology at Cemex, a cement and building aggregates producer in Monterrey, Mexico, has employees devoted to analyzing new technologies. The result: initiatives such as Cemexnet, the company's domestic network established in 1988 to facilitate communication among plants throughout the country. It has since expanded to reach sites in Latin America and Europe. The technology used for the network varies by region. In Latin America, Cemex uses time division multiplexer satellite networks; in Europe, fiber-optic networks. Electronic mail and groupware applications run through these networks, which support TCP/IP, IPX and SNA traffic. A desktop videoconferencing network, now being installed, will connect systems throughout the world via an ISDN gateway, Luna says.

LUNA

FACTOID

CEMEX started one of the first satellite networks in Mexico in 1988.

Cerveceriás Quilmes

With six breweries and four distribution centers, Cervecerias Quilmes is the top brewery in Argentina. Its in-

MORE ☞

Company	1995 IS spending	1995 network spending	IS staff	Networking staff
Benetton	$17M	$2M	150	20
Black & Veatch	$46M	$7M	400	30
Cemex	$30M	$20M	275	40
Cervecerias Quilmes	$5M	$2M	34	15
Charles Schwab	$120M	$70M	560	260
CSX Corp.*	$300M	$81M	1,183	305
Federal Express	$525M	$220M	3,880	320

*Includes CSX Transportation

Percent spent on LANs	Percent spent on WANs	Percent spent on Internet/ intranet
20%	10%	2%
10%	20%	10%
20%	15%	10%
47%	32%	2%
28%	50%	5%
18%	14%	0%
15%	25%	8%

☞ CERVECERIAS QUILMES

ternetworking structure supports 700 sites; its 25 servers handle the business, administrative, production and Internet/intranet systems.

In January, the brewery began an Internet/intranet project that allows it to exchange data with its distributors; it hopes this will improve the flow of information. So far, the intranet is handling 35% of the information on product lists, prices, advertising supplies and the status of accounts and trucks; the rest is conveyed by phone. The brewery plans to have all distributors on the network by the end of the year.

FACTOID

Cervecerias Quilmes was the first company in Argentina with an intranet, says IT chief Aldo Gianelli.

GIANELLI

This type of networking strengthens business relationships. "The distributors perceive that Quilmes is something open. They can interact with the areas they need, whenever they need," says Aldo Gianelli, IT and services chief for the brewery.

FedEx

Federal Express Corp. doesn't waste any time. Ten minutes after a package is delivered, the company's database contains confirmation that the package reached its destination. How is that possible? Start with a network that supports more than 500,000 devices. "All we are is a series of networks, airplanes and vehicles that work together to move the product and information. Every aspect of the business is oriented around the network strategy," says Winn Stephenson, vice president of network computing at the Memphis-based firm.

STEPHENSON

FACTOID

The average number of electronic transmissions a day at FedEx totals more than 45.5 million.

Technology also now allows customers to track their packages without calling FedEx. Based on the size of their company, customers receive a configuration of a system called Powership. A large company, for instance, may have direct electronic data interchange links to a FedEx computer; a smaller office might use Windows-based software. Powership generates labels and places the information in a FedEx database for billing, tracking and tracing, according to Stephenson; 60% to 70% of orders are now processed this way. Eventually, FedEx plans to have 100% of its transactions handled electronically. Users can also connect via the Internet and check a package's status on FedEx's Web site (http://www.fedex.com).

MORE ☞

Company	1995 IS spending	1995 network spending	IS staff	Networking staff
First National Bank	$168M	$29M	1,273	99
Fisher & Paykel	NA	$3M	80	8
Geffen Records	$1M	$1M	7	7
Maruti Udyog Ltd.	$5M	$1M	82	5
Merita Bank	$190M	$50M	600	50
National Computer Board	$108M	$5M	600	30
Petrobras	$375M	$120M	1,969	792

NA=Not available

Percent spent on LANs	Percent spent on WANs	Percent spent on Internet/ intranet
25%	61%	0%
50%	25%	2%
50%	10%	15%
34%	2%	1%
60%	25%	2%
85%	13%	2%
20%	40%	1%

Fisher & Paykel

MAIN

If imitation is the sincerest form of flattery, New Zealand's Fisher & Paykel should feel honored. A U.S.-based appliance company emulated Fisher & Paykel's method of compressing product cycle time to reduce cost and improve performance. What enables that method to work is the company's data network, which creates a "flexible real-time scheduling environment," says David Main, network manager. The company manufactures a range of products, including refrigerators, dishwashers, humidifiers and factory control systems.

Using networking technologies such as Asynchronous Transfer Mode, Fiber Distributed Data Interface and Integrated Services Digital Network, Fisher & Paykel's network is flexible. "Our current network configuration provides seamless access for any user to any application/database from anywhere at any time, with constraints placed on access privileges for data security," Main says. Global users range from retail dealers, who use terminals to place orders, to engineers, who use high-powered CAD/CAM systems to design products.

FACTOID

Fisher & Paykel's whiteware factories are capable of modifying production within 20 seconds.

National Computer Board

The National Computer Board's mission is to make Singapore an "intelligent island" by the year 2000. The board, created in 1981 to drive the nation into the Information Age, is now developing a multimedia broadband network called the Singapore One Network for Everyone, or Singapore ONE. The objective is to create an infrastructure that connects several local-access networks so that, effectively, one network links the island. It will carry commercial and governmental services, from high-speed Internet access to teleshopping.

"By linking all the government departments, the various value-added networks, the offices and homes electronically, we are moving toward our vision of providing one-stop, nonstop government services to the public," says Goh Beng Tan, a board director.

FACTOID

Singapore ONE is "government-encouraged, but industry will build and operate [the infrastructure]," notes Michael Yap, a board director.

MORE ☞

Company	1995 IS spending	1995 network spending	IS staff	Networking staff
Peugeot Citroen	$500M	$100M	2,000	40
Schindler Informatik	$90M	$13M	460	36
SmithKline Beecham	$300M	$100M	2,500	100
START Informatik	$127M	$52M	150	100
Swissair	$190M	$45M	880	61
Tempus	NA	$1M	6	14
The Times of India*	$3M	$1M	75	15

* Figures for parent company Bennett, Coleman & Co. NA=Not available.

Percent spent on LANs	Percent spent on WANs	Percent spent on Internet/ intranet
15%	15%	1%
35%	35%	1%
25%	10%	1%
1%	80%	0%
10%	87%	1%
6%	38%	8%
20%	35%	10%

START Informatik

FICHT

Travel agencies in 16,400 locations throughout Germany can book reservations and handle payments for everything from railways to hotels to tours with START Informatik GmbH's travel distribution system, called START. During peak hours, the system handles 318 transactions per second.

The company's WAN is an X.25-based network that connects nearly all of the travel agencies in Germany to START's central system in Frankfurt, says Roland Ficht, head of the production and network division at START Informatik, which handles the networking aspects of the system. The system itself is owned by parent company START Group. The router network has limited TCP/IP connections, though the company is considering increasing the number of connections. It also is considering an intranet, "to increase the efficiency of internal communication and exchange of information," Ficht says.

FACTOID

More than $18 billion worth of tickets, invoices and the like are issued each year via START.

Tempus

It may not be something made out of nothing, but the information network that connects three Bulgarian universities was made out of very little. As EU Tempus project members say, "to design a good network with a bulk sum of money is well done engineering; to design the same network with a lack of money is simply art."

Members of the project, which is part of the European Union program in the Trans-European Cooperation Scheme for Higher Education, used existing equipment but new technologies and mostly donated resources to get started last year. That's when they installed network backbones at the three Sofia-based schools: The Sofia University St. Kliment Ohridski, The Technical University at Sofia and The University of National and World Economy.

Now, teachers and students can use the system for educational and research purposes.

The next phase is to connect the schools to the national Bulgarian Academic Network and the Internet. In all, 11 universities and research institutions sponsor the project through donations of money, time and training. ●

FACTOID

With just $730,000 to connect the universities to the Bulgarian Academic Network and the Internet by 1997, EU Tempus is counting on volunteers and good management.

Snapshot information *compiled by Amy Malloy.*

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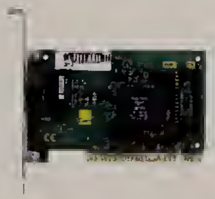

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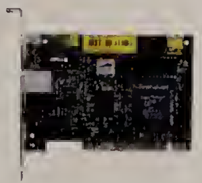

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